RUSS OLSON VOLUME 26B

MINNEAPOLIS, ST. PAUL, ROCHESTER & DUBUQUE ELECTRIC TRACTION COMPANY

Description

Information regarding the above-named rail company sometimes referred to as the "Dan Patch Line."

Sub-divisions Within This Volume

- Equipment
- Contents of the Back Pocket

EQUIPMENT

STRANG GAS-ELECTRIC CAR COMPANY

During 1905-1906 the Missouri & Kansas Interurban Railway (The Strang Line) was building a 22-mile railroad between Kansas City, Missouri, and Olathe, Kansas. The M&K's owner, William B. Strang, Jr., had designed a gas-electric motor car incorporating some advanced ideas for their time, for which he had obtained several patents. He formed the Strang Gas-Electric Car Company of which he was president and Lars G. Nilson chief engineer. Carbodies were designed by Strang and Nilson, the engine and accessories by Nilson. Engines and generators were built in the Strang shops in Garwood, New Jersey, under the personal supervision of Strang and Nilson. The J. G. Brill Company, Philadelphia, built the carbodies, furnished the trucks and traction motors, and assembled the entire car.

#1 OGERITA

The first car was built under J. G. Brill Co. order number 14184 dated 2-13-1905 for William B. Strang as the Parlor Car "Ogerita". The car was named after Miss Ogerita Strang of Kansas City, a niece of Mr. Strang. It was lettered for the Strang Gas-Electric Car Co. Cost to build the car amounted to $12,500. Apparently after several trial trips the center entrance was removed and the parlor car wicker arm chairs replaced with leather-covered transverse coach seats to increase the seating capacity. The Street Railway Journal of 3-3-1906 describes the technical details of the car after these modifications. The car was re-lettered The Strang Electric Car.

The following additional details were obtained from the 4-15-1908 issue of Brill's Magazine. The gasoline engine was a V-6, four-cycle with 8" x 10" cylinders. The battery was wired in parallel with the generator. A starting rheostat drawing power from the battery temporarily converted the shunt-wound generator into a starting motor for automatically starting the gasoline engine. The traction motors drew current from both the battery and the generator during starting and acceleration, or operation on steep grades, but only from the generator once the car was up to speed. A carpet covered the hardwood floor; silk curtains, draperies and the upholstered wicker arm chairs were colored dark green.

The New York Times article dated 2-27-1906 provides details of the California promotional trip mentioned in the Street Railway Journal article.

In April 1906 the car traveled 1500 miles under its own power from the J. G. Brill Co. plant over steam railroad tracks to the SLSF RR depot at Lenexa, Kansas; arrived 4-16-1906. The car was used for a time to haul freight cars from the SLSF RR connection at Lenexa to various sites where the railroad was under construction. It was reported to have pulled as many as six flat cars loaded with rails and ties. On 5-28-1906 the railroad began service with OGERITA from the Lenexa Station to 39th St. and State Line in Kansas City. Four daily round trips were operated.

J. G. Brill Company records include an Order Number 15948 dated 4-5-1907 for the M&K Interurban Ry. with the description “Interurban type car 43'8" over body”. This supposedly applies to OGERITA; the nature of the work performed is unknown.

#2 GERALDINE
#3 MARGUERITE

J. G. Brill Company order number 14877 dated 12-22-1905 was for M&K Interurban Ry with the description "48'9" car". Order No. 14877 applied to the carbody, No. 14878 to electrical work, No. 14879 to one Brill 27E-1 truck, No. 14880 to one Brill 27E-2 truck. Both cars were built under these order numbers although of different body styles. Refer to the engravings. #2 was under construction in February 1906 and #3 was nearing completion in early August 1906. Lettered for Missouri & Kansas Interurban Railway.

Newspaper accounts report that MARGUERITE arrived first, in July 1906, with GERALDINE arriving in August 1906. The service was increased to five daily round trips 7-13-1906 after MARGUERITE arrived. GERALDINE was placed in service 9-28-1906. On Sunday 10-21-1906 regular service began from Olathe to 39th St. and State Line.

Details were reported only for MARGUERITE. 48 ft. long over end panels, 52'9" long over the crown pieces, and 9'6" wide. The passenger compartment was 27'5" long, smoking compartment 10'8" long, and engine room 14'8" long. Interior woodwork was colored a green tint and the seats covered with red leather. The gasoline engine was a vertical four-cycle design with 10" x 10" cylinders. Brill 27E-1 ½ trucks, 250 volt, 50 Kw DC generator, K-13 controller(s).

GERALDINE was shorter, had McGuire 10A trucks, and cost $15,000. Also lettered for Missouri & Kansas Interurban Railway.

J. G. Brill Company records include Order Numbers 15950 and 15952 for the M&K Int. Ry. dated 4-5-1907 with the description "Interurban type car 43'8" over body". These supposedly applied to MARGUERITE and GERALDINE respectively; the nature of the work performed is unknown.

ELECTRIFICATION OF THE M&K INTERURBAN RY.

The 4-15-1908 issue of Brill's Magazine reported that three Strang gas-electric motor cars had been in continuous use for two years hauling trains of two cars in regular service. No problems were mentioned.

Despite some early enthusiastic reports, the Strang cars were evidently less than a complete success on the M&K Int. Ry. Apparently they were under-powered for the hill-and-dale terrain traversed and would stall frequently on the steeper grades. There were long delays in obtaining spare parts. Despite claims of ease of operation personnel competent to operate and service the cars were difficult to find.

The book "Heartland Traction" reports that "during the winter of 1907-1908 service continued to decline as well as the number of passengers." The line's general manager recall having to frequently spend entire nights at the carhouse to repair a disabled car. "The cars could not be returned to the tracks fast enough." "By mid-spring the line had virtually ceased to operate. As early as mid-February [1908] the railroad officials had begun to discuss replacing the noisy, smelly, and often balky gas-electric cars with all-electric interurban cars. In late March [1908] the Strang Line officially confirmed its decision to convert to an electric line. For several days in early June [1908] service was sporadic at best. Cars ran at infrequent intervals and with few riders. On June 11th the line borrowed a gas-electric car from the short-lived Mathews-Davis Railway Motor Car Company of Kansas City to haul what few passengers the line still had. Unfortunately this car had the same hill-climbing problems as the Strang gas-electric cars." On July 15, 1908, the entire railroad was shut down so that the electrification work could be undertaken. It was claimed that the Arnold Company of Chicago used OGERITA to transport its workers to the work sites during the time the line was being electrified.

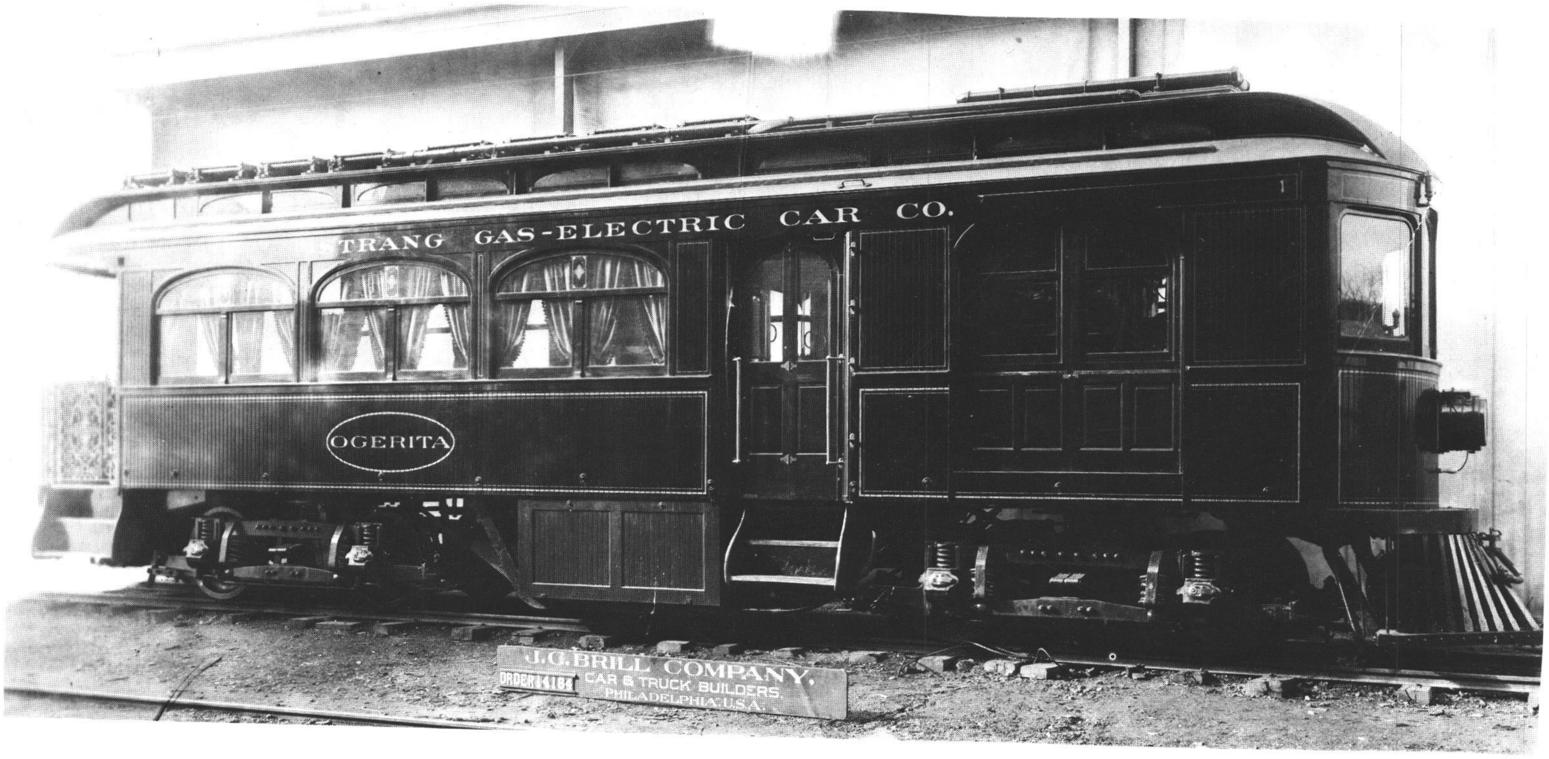
Electrification was completed November 26, 1908. However there was a delay in shipping the new electric interurban cars. The first three cars arrived December 24th. OGERITA was used to provide service until regular electric service began January 14, 1909.

GERALDINE was rebuilt to electric passenger-baggage motor car #101 during 1908 at a cost of $872. It was destroyed in the Overland Park carhouse fire 2-11-1925.

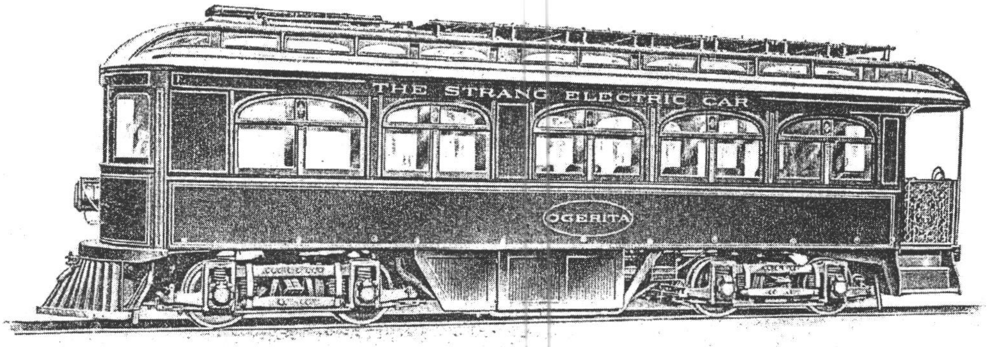
Numbers 102-106 were the new electric passenger motor cars.

MARGUERITE was rebuilt to electric freight motor car #107 in 1908. It was the last car to operate over the M&K Railroad in freight-only service from July 9-25, 1940.

What use was made of OGERITA from early 1909 to mid-1910 is unknown. It was shipped to the Minneapolis, St .Paul, Rochester & Dubuque Electric Traction Co. in June 1910.

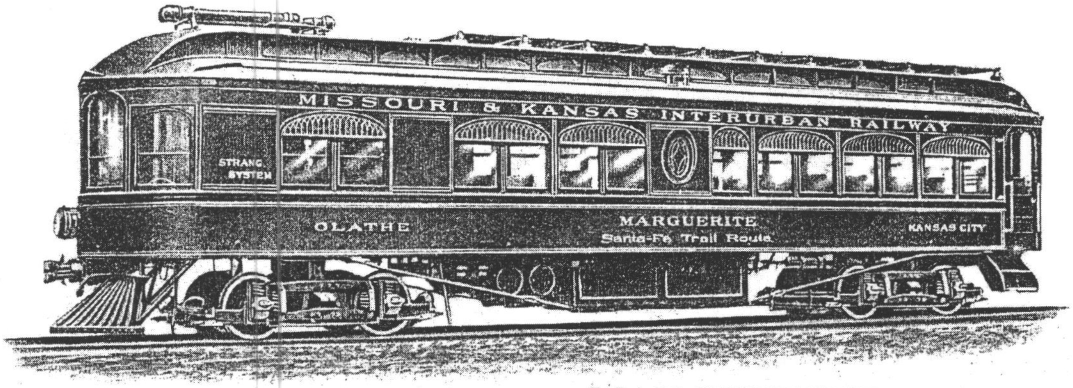


THE FAMILY OF STRANG GAS-ELECTRIC CARS

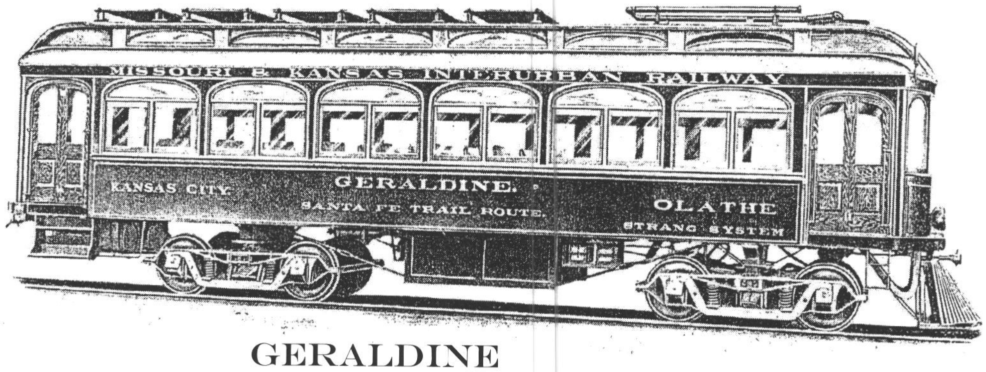

THE STRANG ELECTRIC CAR
OGERITA

OGERITA

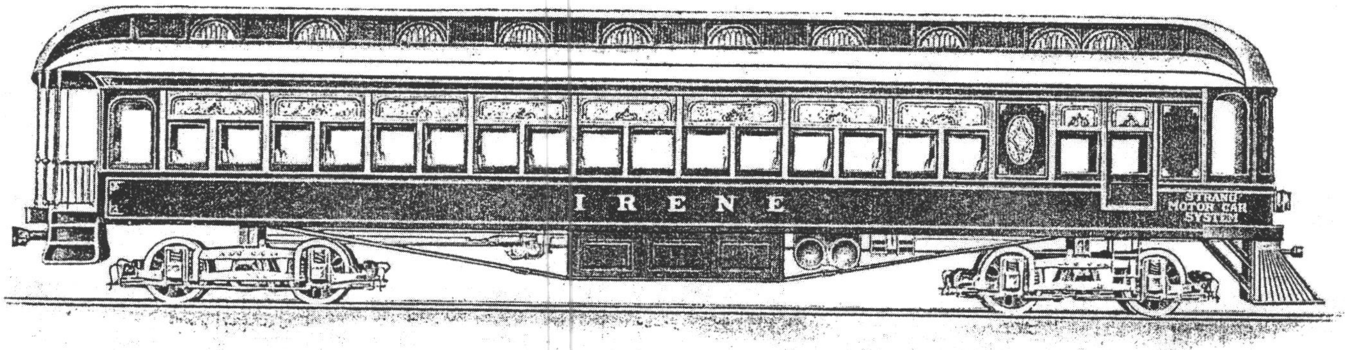
All pictures from the Strang Gas-Electric Company brochure, courtesy of the Kansas State Historical Society


MISSOURI & KANSAS INTERURBAN RAILWAY
STRANG SYSTEM
OLATHE
MARGUERITE
Santa-Fe Trail Route
KANSAS CITY

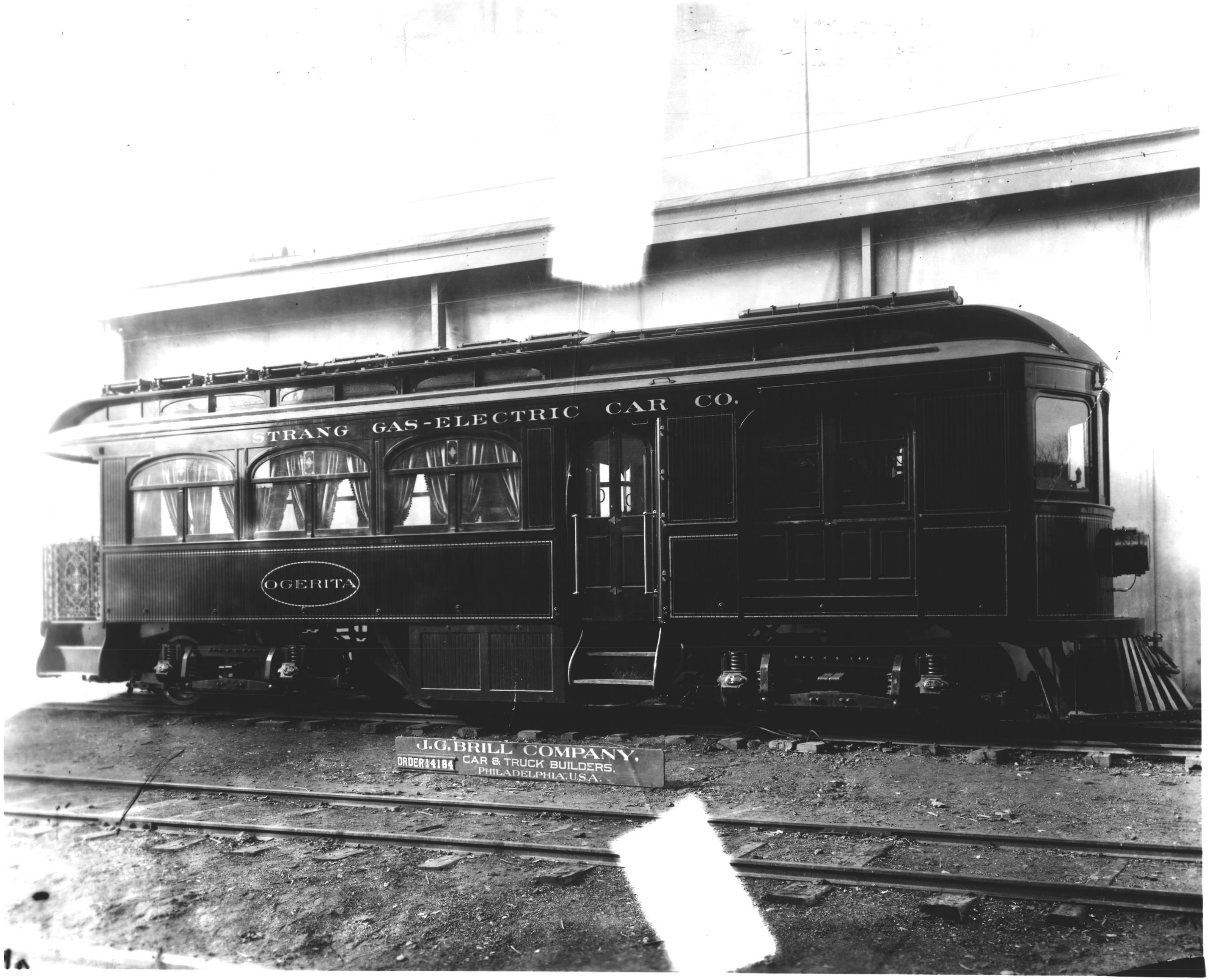
MARGUERITE


MISSOURI & KANSAS INTERURBAN RAILWAY
KANSAS CITY
GERALDINE
SANTA FE TRAIL ROUTE
OLATHE
STRANG SYSTEM

GERALDINE


IRENE
STRANG MOTOR CAR SYSTEM

IRENE


STRANG GAS-ELECTRIC CAR CO.
OGERITA
J.G. BRILL COMPANY.
ORDER 14184
CAR & TRUCK BUILDERS.
PHILADELPHIA, U.S.A.
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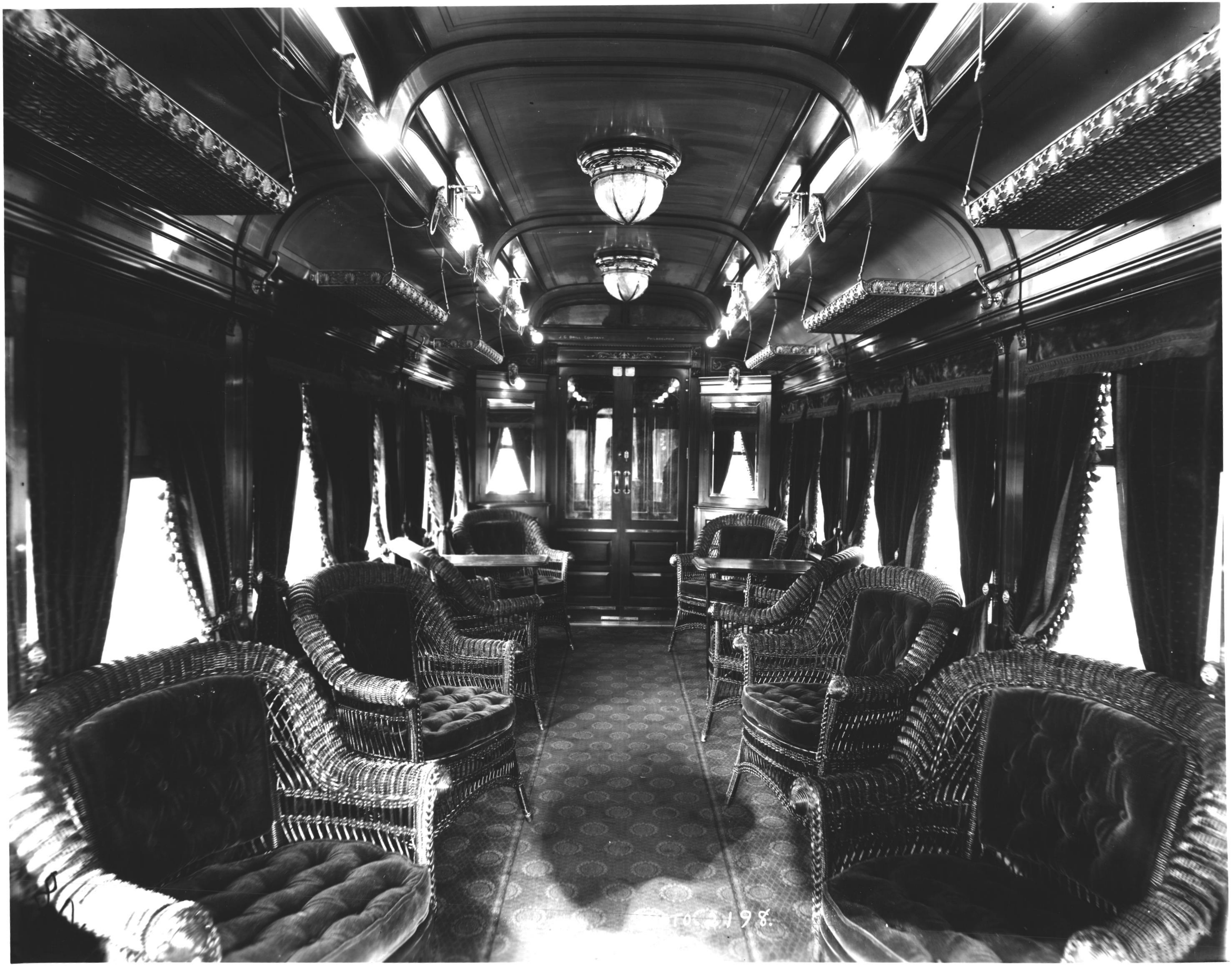
J. G. BRILL COMPANY PHILADELPHIA
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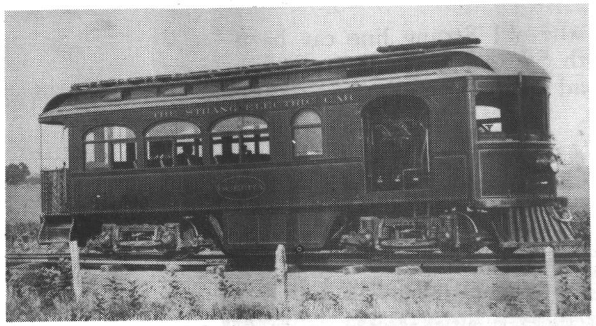
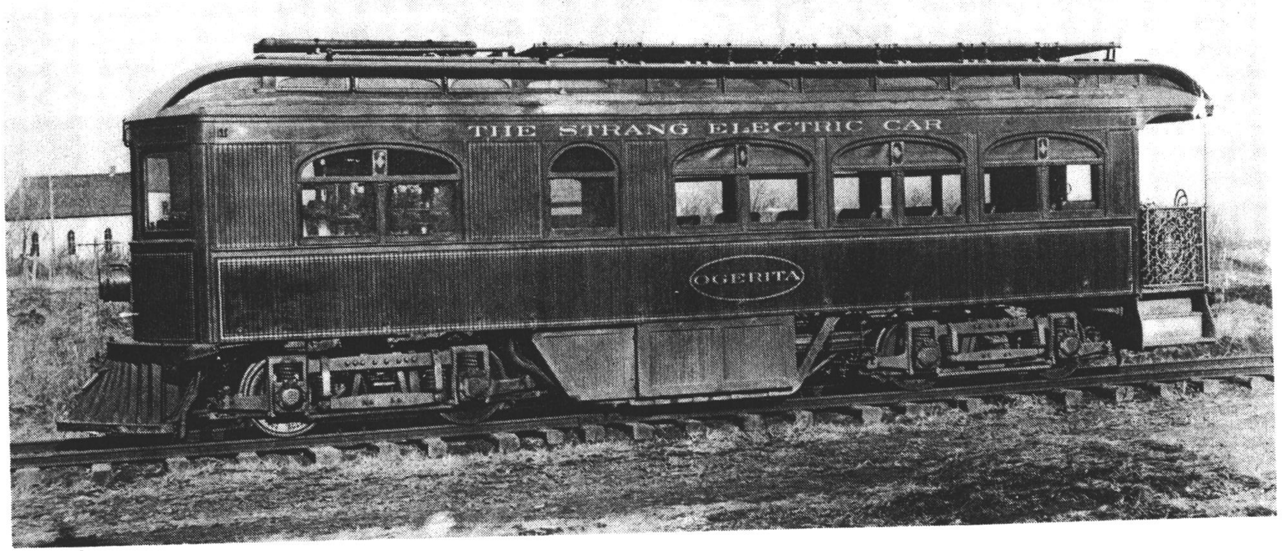
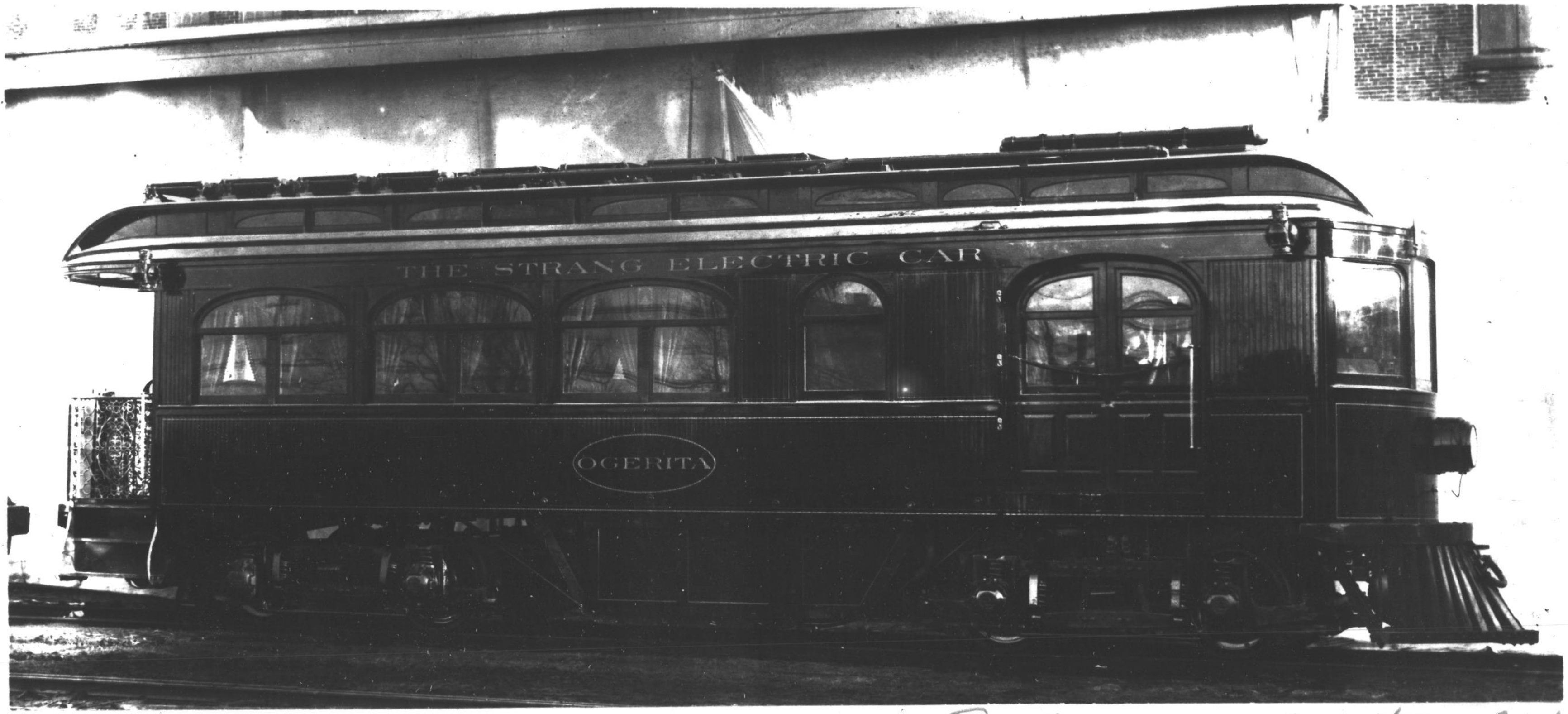

THE STRANG ELECTRIC CAR
OGERITA

The first Strang line gasoline-electric car Ogerita, manufactured by the J. G. Brill Company of Philadelphia under patents owned and controlled by William B. Strang, Jr., and costing approximately $12,500. Ogerita, first operating on the Strang line in May, 1906, was sold to the Dan Patch line in Minnesota in 1908.

ED KEILTY COLLECTION


THE STRANG ELECTRIC CAR
OGERITA


THE STRANG ELECTRIC CAR
OGERITA

Note - no center door

STORAGE ELECTRIC CAR TO CROSS CONTINENT

Comes Here from Philadelphia at Forty-five Miles an Hour.

OFF FOR 'FRISCO TO-MORROW

Experts Think the Ogerita Will Help Solve Problem of Electrical Railway Propulsion.

2-27-1906 NY TIMES

A dapper little railway car, running all by itself and with flags flying, approached the Pennsylvania Station in Jersey City shortly after 1 o'clock yesterday afternoon, nosed its way through the maze of switches as though it were familiar with the place, and quietly came to a standstill on Track No. 1. It immediately became the centre of a curious throng.

"What is it?" was to be heard on every hand. The answer was printed on the side of the car itself. It was the Ogerita, the independent Strang electric car, which had just arrived from Philadelphia on a trip in which forty-eight miles an hour was the average speed. W. B. Strang, President of the Strang Electric Railway Car Company, was on hand to receive those who had made the journey.

They were J. P. Yerge, Assistant Superintendent of Motive Power of the Pennsylvania system; B. T. Murphy and J. W. Rogers, assistant engineers in the motive power department at Altoona, Penn.; Division Supt. Lovell of the Amboy Division; Lars G. Nilson, the designer of the car; J. A. Vandegrift, who has charge of it, and the train master of the New York Division of the Pennsylvania Railroad.

Those who made the journey said that the car had shown itself to be a remarkable product of mechanical skill. They declared that it was a great advance toward solving the problem of electrical railway propulsion.

The Ogerita is scheduled to start from the West Shore Railroad's terminal in Weehawken on its long journey to San Francisco to-morrow. This will be the first attempt to run a car by an electric motor across the continent on rails. A self-propelling motor car made by another company is about to begin the eastward transcontinental journey, starting from San Francisco.

It is urged for the Strang car that it eliminates the power house and the overhead system. It is also said that it is destined to meet all the requirements of an independent electric car. The system is a combination of a gasoline engine, a dynamo, and storage battery. The engine furnishes the power to run the dynamo, and thus generates the electricity for the motors that operate the car, and the storage battery, on the one hand, receives the surplus power from the generator when the load is light, and, on the other hand, furnishes the excess power required during acceleration and on steep grades.

This car is mounted on high-speed trucks. Trial trips have been made on the main line of the Baltimore and Ohio Railroad, between Philadelphia and Wilmington and from Philadelphia to Atlantic City. In the last two weeks many trips have been made over the branches of the Pennsylvania system, which have the steepest grades and the shortest curves. All the trips were made without mishap and were considered very satisfactory by the railroad officials.

"This car," said Mr. Strang yesterday, "weighs thirty-nine tons. The car itself is narrow for the reason that when we reach Chicago and other large Western cities we intend to switch it to the street-car lines. In its present shape the car can turn any street corner."

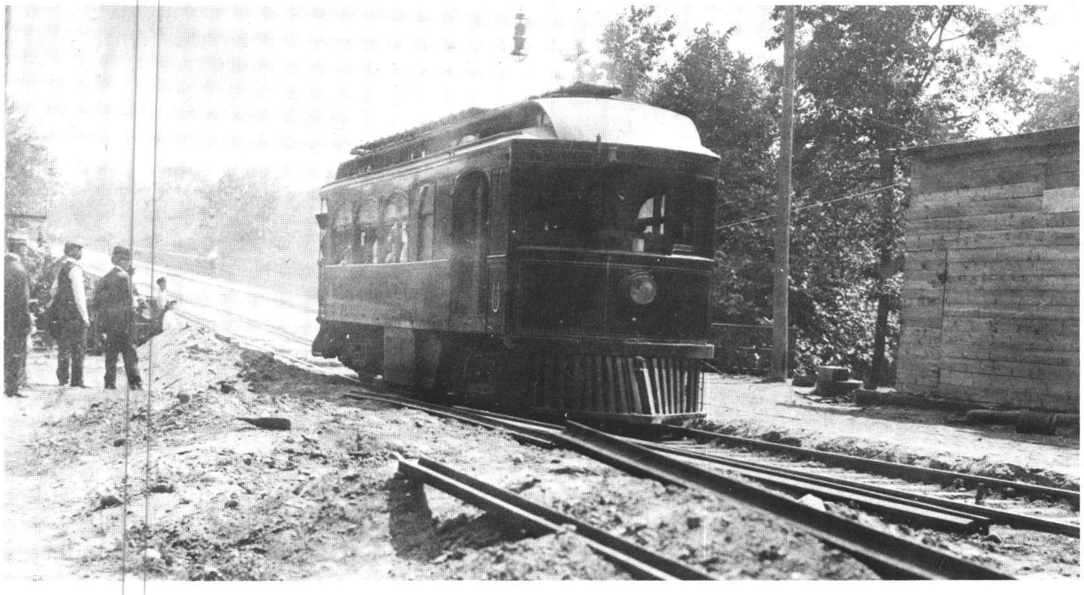
The motors are in the forward compartment, while in the rear the passenger compartment is fitted up as an observation car. It is finished and upholstered in a manner which makes it a fine example of the car builder's art. It is fitted in front with a strong pilot, like that attached to the ordinary locomotive, and has a powerful searchlight. Other cars designed on the same lines, but much larger, are in course of construction. They will have smoking and passenger compartments.

Four-tenths of a gallon of gasoline is sufficient to drive the car one mile. The ignition is of high tension, or "jump spark" type.

The Ogerita will start for Buffalo tomorrow over the West Shore line. From Buffalo it will proceed by the Lake Shore route to Chicago. Thence it will travel to St. Louis over the Chicago and Alton Railroad. It will run over the Rock Island system to El Paso, and from El Paso to San Francisco over the Southern Pacific. Mr. Strang will make the journey, and will have for his guests railroad officials of the different lines traversed.

Several locomotive engineers of the Pennsylvania and West Shore lines saw the car yesterday. They had but one opinion of the future of the system embodied in the Ogerita.

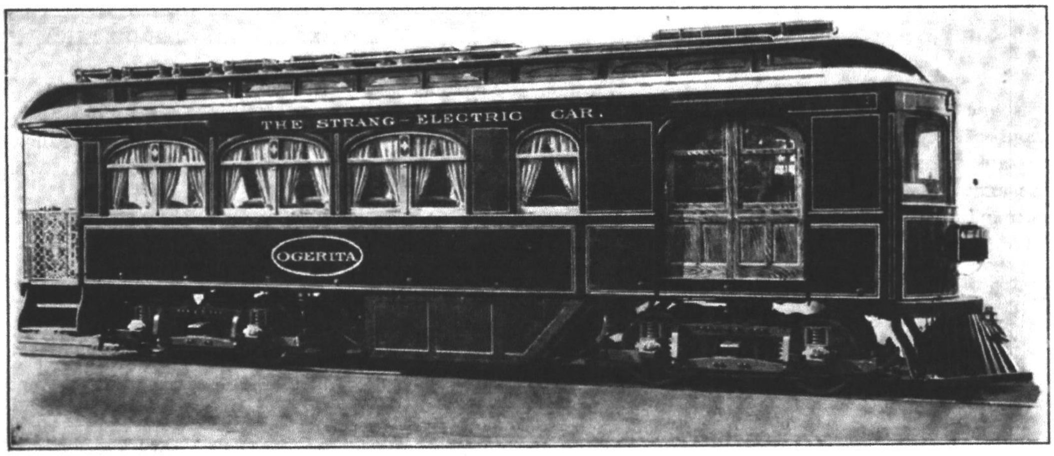
"You've got us skinned a mile," they said.



Passenger car 1, "Ogerita", southbound on Nicollet Ave., Minneapolis, at the bridge over Minnehaha Creek near 54th St., 1911. (Minnesota Historical Society collection)

A NEW TYPE OF GASOLINE-ELECTRIC CAR

The gasoline-electric car shown in the accompanying illustrations was recently built for the Strang-Electric Car Company, of New York, by the J. G. Brill Company. Trial trips have been made over the main line of the Baltimore & Ohio Railroad, between Philadelphia and Wilmington, and officials of that railroad, of the Pennsylvania Railroad Company, of the American Locomotive Company, and prominent railway men from New York and elsewhere, have made up the parties and have watched the operation of the car with interest. This car has left the car works at Philadelphia on a trip to the Pacific coast by way of the Pennsylvania Railroad to Jersey City, the West Shore and New York Central lines to Buffalo, Lake Shore & Michigan Southern to Chicago, from Chicago over the Chicago, Alton & Rock Island Railroad to St. Louis and Kansas City, then over the St. Louis & San Francisco Railroad and Southern Pacific to San Francisco. The return trip will be made over the same route to Chicago, and from there over the Pennsylvania Railroad to Philadelphia. The Brill Company is building other cars of the same type for this company, which will measure 52 ft. 9 ins. over the vestibules. These cars will have smoking and passenger compartments and are to be mounted on high-speed trucks of the No. 27-E type. They are for use on the line of the Missouri & Kansas Interurban Railway, running over the Santa Fe trail from Kansas City, Mo., to Olathe and southwestern Kansas.



SPECIAL CAR OPERATED BY THE GASOLINE SYSTEM

The Strang-Electric Car Company believes that the system which it has perfected will meet all the requirements for independent operation. The system combines a gasoline engine, generator and storage battery. The engine furnishes the power to run the generator, which generates electricity for the truck motors, and the storage battery receives the surplus power from the generator, when the load is light, to furnish automatically the excess power required during acceleration and on steep grades. The use of a generator and motors to transmit power between the engine and the wheels of a motor car may, to many, seem unnecessary. This combination, however, has proved highly satisfactory. Considered merely as a clutch and change gear, it is superior in simplicity and economy to any mechanical appliance for a similar purpose. The advantages of the gasoline engine over other prime power producers, are its light weight and economical operation. The reasons which are given for not driving the car directly by a gas engine are, first, that a practical means of transmission has never been discovered, as the gear and friction clutches used in automobiles are not suitable for a heavy car for railroad use, because they have no elasticity in starting and are unreliable; second, that direct operation by a gas engine requires one which is large enough for the highest possible demand, regardless of the average power required, as there is no reserve power for temporary overloads; and third, the difficulty of starting a direct-connected gas engine is a serious obstacle, since it must be done by the application of extraneous power. Therefore, while the gas engine is the lightest and most efficient power producer, the difficulty of its control renders direct connection with the axles impracticable. By combining the two systems, using the gasoline engine for primary power, electric transmission and control taking care of the peak of the load of the storage battery, it is claimed that an ideal system for independent electric cars is obtained.

The general plan of the system is shown in the diagram, and consists of a gas engine with a direct-conected generator, electric transmission and control, direct connection between the generator and the truck motors and a storage battery. Attention is particularly directed to the fact that this system requires an engine only large enough to develop the average power used. The engine was built by the Strang-Electric Car Company and designed by its chief engineer, Lars G. Nilson, is of the four-cycle type and has six 8-in. x 10-in. cylinders.

To secure a short crank shaft and reduce vibration to the minimum, the cylinders are partially opposed, three on each side, and are set at an angle of 90 degs. to each other. An advantage of this construction is in the accessibility of the parts. The bearings and wearing surfaces in general are much larger than customary, but the weight of the entire engine is reduced by using aluminum for covering parts where there is no strain. The engine frame is a substantial cast-steel structure, securely bolted to a rectangular base of the same material. The vaporizer is arranged to work with the utmost economy with all kinds of loads. Kerosene, alcohol or crude oil may be used instead of gasoline with a slight change of adjustment of the vaporizer. The ignition is of high-tension, or "jump spark" type, with coils of a special design, one coil for each cylinder, and all operating from one interrupter. The commutator is driven from the end of the cam shaft and is outside the casing at the rear of the engine. The oil is contained in a reservoir placed beside the base of the engine and pumped to the different bearings; it is returned to a filter located over the reservoir. A centrifugal pump, belted to the fly-wheel,

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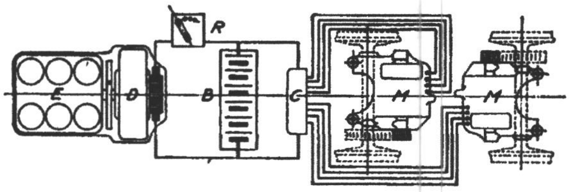
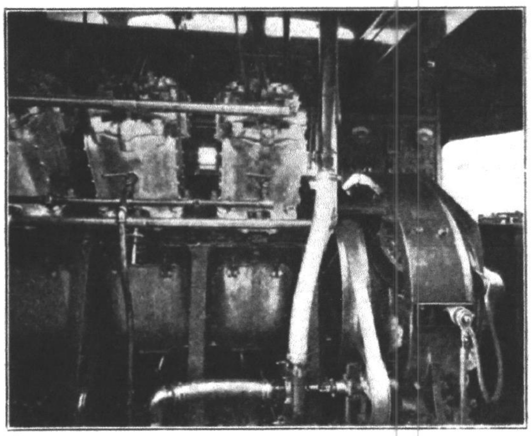
draws water from a tank in the vestibule at the center of the car and forces it through the cylinder jackets and to radiating pipes upon the roof. In cold weather, the passenger department is heated by the water from the cylinder jackets. The gasoline is stored in a tank underneath the car floor, is pumped to an overflow cup at the side of the vaporizer, and the excess returned by another pipe to the tank. The cells of the storage battery are placed on a cradle underneath the center of the car. By the use of 250 volts, instead of the usual 500, the number of cells is reduced and a more reliable insulation secured. The electrical equipment consists of a 50-kw 250-volt d. c. generator, 400 r. p. m. directly coupled to the gasoline engine; two 50-hp serieswound motors of standard railway type, two K-13 controllers; and a storage battery of 112 cells having 200 amp.-hours capacity.



GENERAL PLAN OF THE STRANG SYSTEM

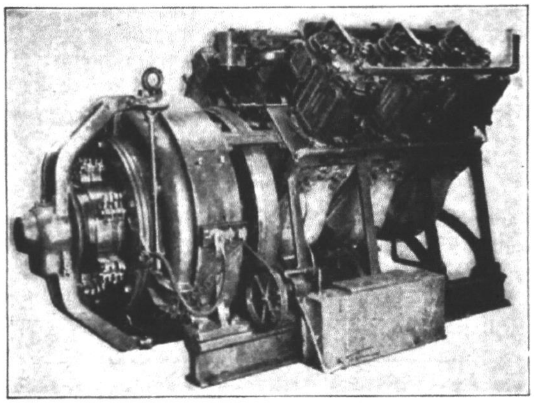
E—Engine; B—Battery; M M—Motors
D—Dynamo; C—Controller; R—Starting Rheostat

In the gasoline-electric system adopted, the inclusion of the storage battery enables the engine to run practically at the same speed at all times, with the air and fuel adjusted once and for all for the best possible combustion. As to preventing the battery from being overcharged while running with a light load, it will be remembered that it requires a pressure of two and one-half volts to charge a storage battery, while during discharge the pressure falls to about two volts. The average voltage supplied to the motors practically corresponds to their rating and, therefore, with a light load they will run faster in the endeavor to use it up, while with a heavy load the voltage will fall sufficiently to allow the batteries to assist the engine in furnishing the necessary current. In other words, the electric transmission being elastic there is always a tendency to adjust the speed of the car to that which is most suitable and economical for the primary power equipment. Moreover, the engine is provided with automatic governing devices dependent entirely upon the condition of the batteries and the consumption of current. This arrangement has nothing to do with the speed of the engine or the motors, but is simply an additional safeguard against overcharging the batteries, is entirely automatic and solely for the purpose of economizing fuel and saving the battery when the car is running light or standing still.



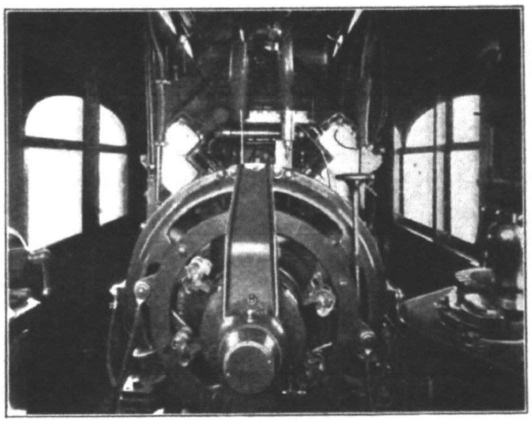
A VIEW OF THE ENGINE THROUGH THE SIDE DOOR

The switchboard is placed against the left side of the engine compartment within easy reach of the operator. It includes a voltmeter, ammeter, starting rheostat and spark control. The platform at the rear of the car is equipped with a controller and a combination volt and ammeter. The maximum speed of the car which can be maintained is 50 m. p. h. The average gasoline consumption is 0.45 gallon per car mile. One hundred gallons of gasoline are carried, which gives a mileage radius of 225 miles.



GASOLINE ENGINE WITH DYNAMO

The car illustrated measures 36 ft. 6½ ins. over the body, and 41 ft. 6½ ins. over the crown pieces; width over the sills, including the sheathing, 8 ft. 4 ins. The passenger compartment is finished in mahogany, richly carved and inlaid. The ceilings are of the semi-empire style, tinted light green and decorated with gold. A handsome rug covers the hardwood floor and silk curtains and draperies and rich upholstering, all of a dark green color, make a very attractive interior. Between the engine room and the passenger compartment is a small compartment separated by sliding doors with glass in the upper part, in which are located a toilet room on one side and a closet on the other. The large observation platform at the rear end has trap doors to close over the step openings, and a dasher and gates composed of old brass grill work. The car is mounted on No. 27-E-1½ high-speed trucks with steel-rolled wheels.



THE ENGINE ROOM AS SEEN THROUGH THE FRONT WINDOW

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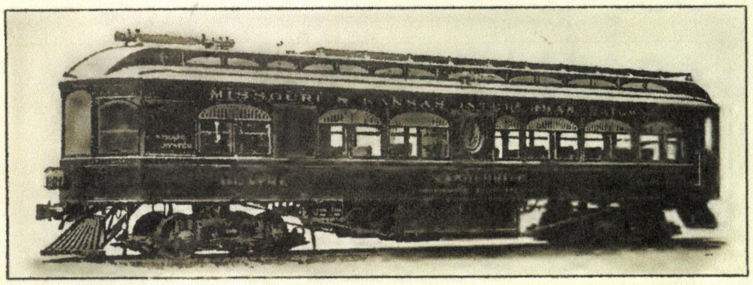
began operating cars between Toledo and Lakeside in 1904. The following year the line was extended to Marblehead and since that time a limited and a local service has been maintained over the system. The local cars cover the distance between the terminals, a distance of 53 miles, in two hours and fifteen minutes. The running time over the line by way of the new route from Genoa to Toledo will not be changed, though the distance is somewhat greater than by the old route.

THE STRANG GASOLINE-ELECTRIC CAR.

In February last the attention of the railway world was attracted by the trial trips of the Strang Gas-Electric Railway Car Company's experimental car "Ogerita," which, after a few preliminary runs on the Baltimore & Ohio and Pennsylvania lines, made the journey from Philadelphia to Kansas City with its own power and has since been in continuous operation on the Missouri & Kansas Interurban Railway.



Strang Gasoline-Electric Car "Marguerite."

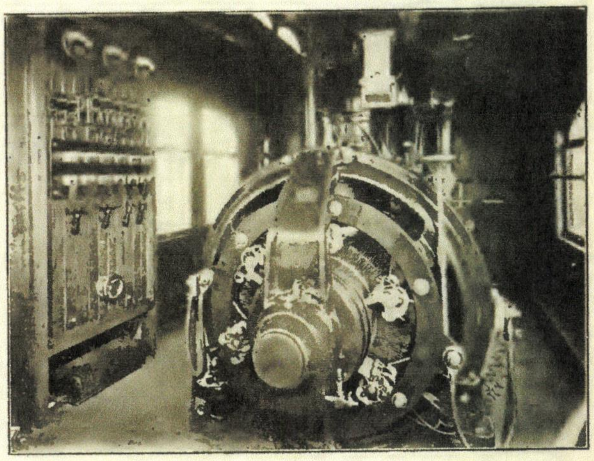
The trip of the "Ogerita" at that time was regarded as an experiment and considerable skepticism was expressed as to the feasibility of such a method of electric car operation, but after the severe tests to which the car has been subjected the manufacturers consider their claims proved, and have since had built two new similar cars for use on that road, the "Marguerite" and the "Geraldine."

The principle of the Strang system is not new; it is the same as that employed in every first-class power house, namely, the peak of the load is taken care of by a storage battery. The system is a combination gasoline engine, dynamo and storage battery. The engine furnishes power to run the dynamo, generating electricity for the motors that operate the car, and the storage battery receives the surplus power from the generator when the load is light and furnishes excess power required during acceleration and on steep grades. The system has been designed upon the understanding that, while the gas engine is the lightest in weight and least expensive to operate of power producers, it is incapable of direct application on account of the method of mechanical transmission required, while the electrical operation of cars under present methods is wasteful in power production and transmission.

What the Strang system is capable of is shown by the remarkable performance of the "Ogerita," which has traveled 18,000 miles without costing a cent for repairs, except for renewal of brake shoes. During the run to Kansas City the average speed for most of the distance was 45 miles an hour, and there was not a single mishap on the entire trip. After arriving at Kansas City, a run was made to Topeka and return. During a heavy snowstorm which was encountered the regular trains were delayed, while the "Ogerita" went through the drifts like a snow-plow, on schedule time. It was then arranged for the car to run over the Santa Fe from Kansas City to Independence and over the Burlington branch. The round trip of 550 miles was made at an average speed of 40 miles per hour, and the average speed on the round trip of 118 miles over the Burlington branch, which has grades of 3½ per cent and curves as high as 16 degrees, was 27 miles per hour. In April the car was put in regular service on a line built by Mr. W. B. Strang for operation by this system, the Missouri & Kansas Interurban Railway, between Kansas City and Olathe, Kan., a distance of 22 miles. While the road was being completed the "Ogerita" took the place of a freight locomotive, sometimes hauling as many as six freight cars loaded with steel. It is now making four trips daily between Kansas City and Lenexa, 15 miles, hauling one and two trail cars, and has never missed a trip for any cause whatever.

The two newly built cars, the "Marguerite" and the "Geraldine," have been given several trial trips and will be placed in service immediately.

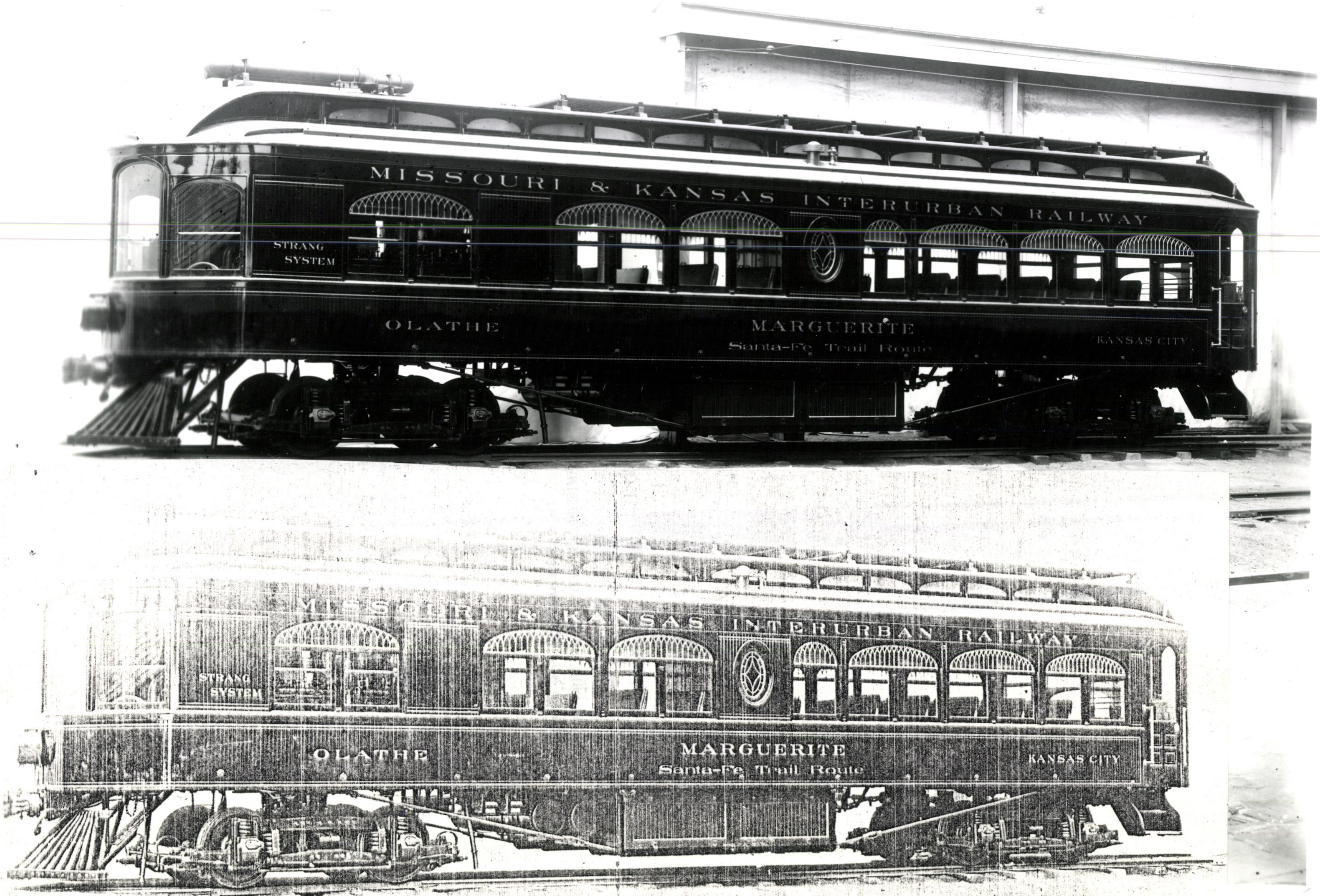
The "Marguerite" left Philadelphia on August 5 for Kansas City over the tracks of the Baltimore & Ohio and Chicago & Alton, making frequent stops for inspection en route. This car is similar to the "Ogerita" and is of the combination passenger and smoker type. The car measures 52 feet 9 inches over ends and the lengths of the passenger, smoking and engine compartments are respectively, 27 feet 5 inches, 10 feet 8 inches, and 14 feet 8 inches. The engine is of the four-cylinder vertical type with 10x10-inch cylinders. The engine requires no attention while running, as the regulating apparatus is automatic, therefore one man can operate both car and engine.



Strang Gasoline-Electric Car—Engine Room.

These cars were built for the Strang Gas-Electric Railway Car Company, of New York, by the J. G. Brill Company, of Philadelphia.

The Nankai Railway, of Japan, the first railway in that country to be converted for electrical operation, has given a large order to an American company for a complete block signal installation.


MISSOURI & KANSAS INTERURBAN RAILWAY
STRANG SYSTEM
OLATHE
MARGUERITE
Santa-Fe Trail Route
KANSAS CITY

STRANG GAS-ELECTRIC CAR COMPANY

IRENE

J. G. Brill Company Order No. 15652 dated 12-6-1906 was for the Strang Gas-Electric Car Co. with a description "56'2" gas-electric body " and "Irene". Brill Order Numbers 15652 applied to the carbody, 15652 ¼ to one Brill 27E-2 trailer truck, 15652 ½ to one Brill 27E-3 motor truck, and 15653 to electrical work. Apparently scheduled for delivery in May 1907 the car was not completed until early 1908. It was named after Miss Irene Kenefick of Kansas City, another niece of Mr. Strang. The car was lettered for the Strang Gas-Electric Car Company. The Brill Magazine of April 15,1908, reported that IRENE had been lately completed. The Street Railway Journal reported that on March 7th,1908, a trial run from Philadelphia to Wilmington and return on the tracks of the Baltimore & Ohio Railroad was made. Among those present were James Rawle, president of the J. G. Brill Company; J. G. Fareira, Brazilian Minister to Mexico; Count Angus Harperi, of Paris; Judge C. Mayer, of New York City; Division Superintendent Voorhees of the Baltimore & Ohio Railroad; R. Buckwater, of the electrical department, and G. B. Koch of the test department of the Pennsylvania Railroad; William B. Strang, L. G. Neilson and W. K. Beard.

Technical details are described in the various periodical articles following.

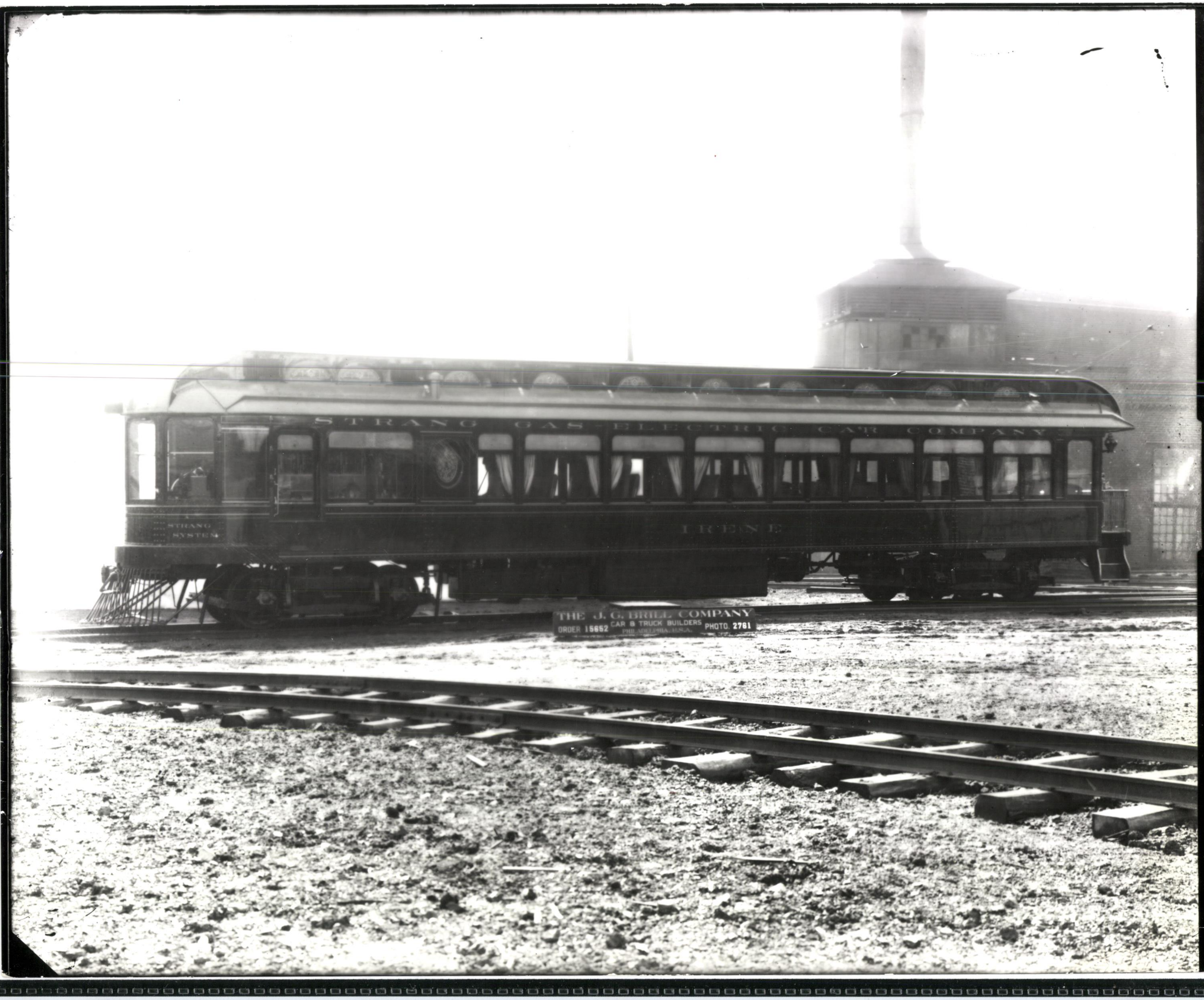
ROSAMOND

This fifth and largest car was built under J. G. Brill Company Order No. 15771 dated 1-23-1907 for the Strang Gas-Electric Car Company with a description "59'7" car, steel body" and "Rosamond". Apparently scheduled for delivery in June 1907 the car was not completed until early 1908. The car's namesake was not reported. The Brill Magazine of April 15, 1908, reported that a car identical in design to IRENE was nearing completion. However ROSAMOND was outfitted as a straight coach with enclosed rear vestibule. Length was 62'8" overall. Same engine, generator and control as IRENE. One Brill 27MCB motor truck and one Brill 27E-3 trailer truck. Weighed 52 tons and seated 48 persons. It left the Brill plant lettered for the Chicago & Alton Railroad, apparently as a demonstrator.

DISPOSITION OF IRENE AND ROSAMOND

It is unclear as to whether either car ever operated on the Missouri & Kansas Interurban Railway. So far we haven't found any information as to their uses during 1908-1909. Both cars were offered for sale through advertisements in the Electric Railway Journal placed by the Twin City Equipment Co. of Kansas City. An ad in the February 1909 issue offered for sale one Strang Gas-Electric Car for $12,000 (probably IRENE). An ad in March 1909 offered for sale two new Strang cars (probably IRENE and ROSAMOND).

J. G. Brill Company records list Order No. 17261 dated 4-2-1910 for the MStPR&DET Co. with the description "#2 alterations", and Order No. 17301 dated 5-10-1910 for the MStPR&DET Co. with the description "Rosamond". Both cars (along with OGERITA) were received by the MStPR&DET Co. during June 1910. It was reported that two of the three original motormen of the M&K Int. Ry agreed to move to Minneapolis and operate the cars for this line.


STRANG GAS-ELECTRIC CAR COMPANY
STRANG SYSTEM
IRENE
THE J. G. BRILL COMPANY
ORDER 15662
CAR & TRUCK BUILDERS
PHILADELPHIA, U.S.A.
PHOTO. 2761

BRILL'S MAGAZINE
PUBLISHED IN THE INTERESTS OF
The J. G. BRILL COMPANY, Philadelphia
AMERICAN CAR COMPANY, St. Louis
G. C. KUHLMAN COMPANY, Cleveland
JOHN STEPHENSON COMPANY, Elizabeth
WASON MANUFACTURING CO., Springfield

VOL. II. APRIL 15, 1908 NO. 4

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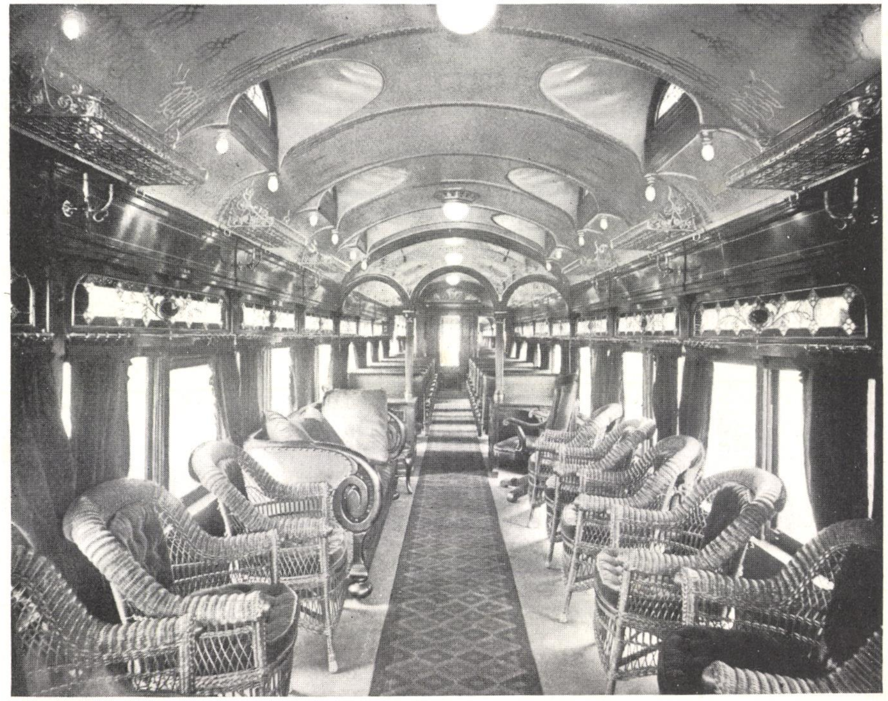
Additional Cars for Strang Gas-Electric Operation

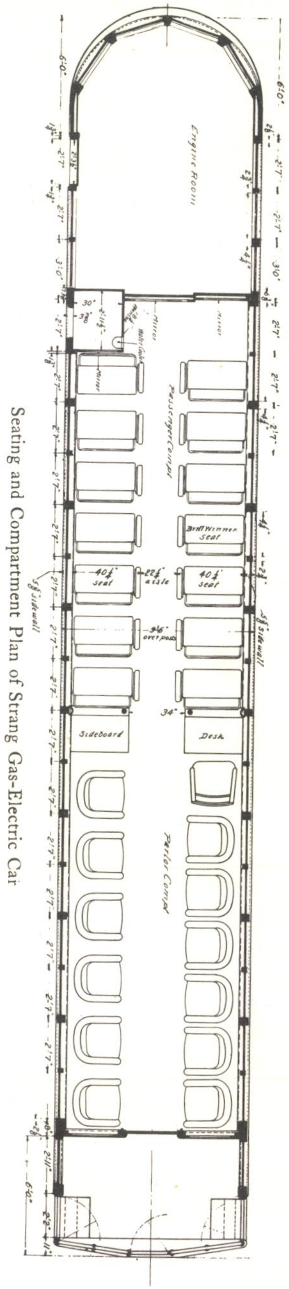
One of the most interesting cars ever built has lately been completed at the works of The J. G. Brill Company for the Strang Gas-Electric Car Company and is now being used to demonstrate the suitability of the Strang Gas-Electric system for steam road spurs, interurban lines, and wherever self propelled cars are needed.



Interior of Passenger Compartment of Strang Gas-Electric Car, Looking Forward

design and features is nearing completion by the same company. The frame and exterior sheathing are composed of structural steel and the general plan and construction includes a number of unique features which successfully adapt it to operation by the Strang Gas-Electric system. The use of structural steel and the avoidance of pressed steel is in accordance with the general practice of The J. G. Brill Company, as greater strength can be obtained, the cost of material is lower and repair work simpler.

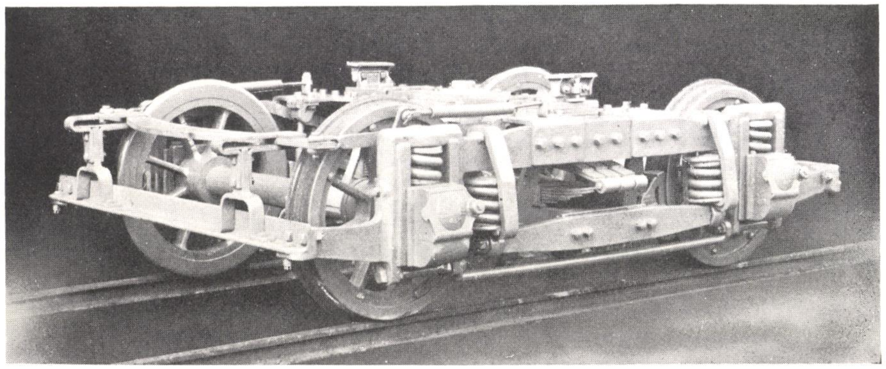
This car is the third and largest that the builder has furnished to the Strang Company. It measures 56′2″ long over the body, 62′2″ over the bumpers, and is 9′6″ wide, over the sides. The height from the track to the under side of sills is 3′5¼″; from under side of sills over highest part of roof, 10′5½″; from floor to center of ceiling, 8′7⅜″. The side sills are composed of 10-inch channels. Vermilion wood, richly carved and inlaid, constitutes the interior finish of the car with the exception of the ceilings which are composed of sheet metal. The roof plan, which is one of the unique features of the car, was designed to accommodate the radiating system for cooling the jacket water of the engine. The roof appears to be of the usual steam car type, but in reality it is quite different as it is entirely open above, exposing the radiators to a free circulation of air. From the interior, the arrangement of the arched roof is very pleasing, the introduction of dormer windows avoids the tunnel-like effect of a plain arch and provides light and ventil-



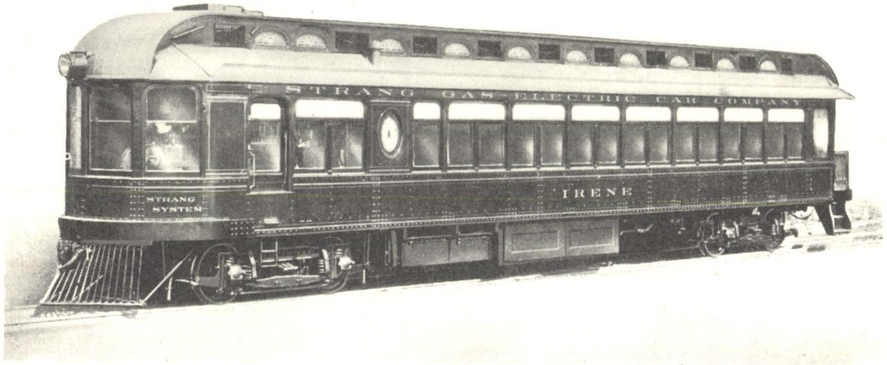
Seating and Compartment Plan of Strang Gas-Electric Car ation. The large side windows add much to the attractiveness of the interior; they are furnished with stained glass in the arched upper section and the window sills are but 24″ from the floor. A section of the front end of the car is detachable to permit the installation of the engine. Other details of the car may be gathered from the illustrations. Weight of car and trucks, fully equipped, 114,000 lbs.

The Brill No. 27-E trucks on which the car is mounted have come in for much favorable comment on the part of the representatives of operating departments of various steam railways and other officials who have accompanied the car during recent demonstration trips. The remarkably easy riding qualities of the trucks permitted higher speed to be attained on the light rails, inferior roadbed and the frequent curves of certain sections of lines that were traversed for experimental purposes, than would be safe with any other type of truck. The principles of this truck, which were described in the last issue of *Brill's Magazine*, provide the accommodation necessary to the trying conditions of ordinary interurban line construction.

The Strang system consists of a gas engine with a direct connected generator, electric transmission and control, direct electrical connection between the generator and truck motors and a storage battery. The operation of the car is practically the same as an interurban trolley car, but unlike the trolley car, it produces its own current and is therefore independent of trolley wire and power

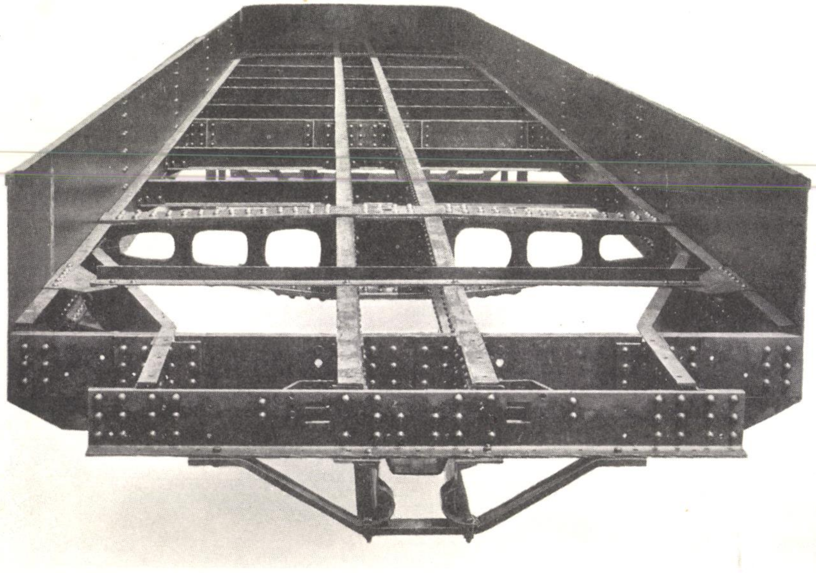


Motor Truck of the Strang Car — Brill No. 27-E Type

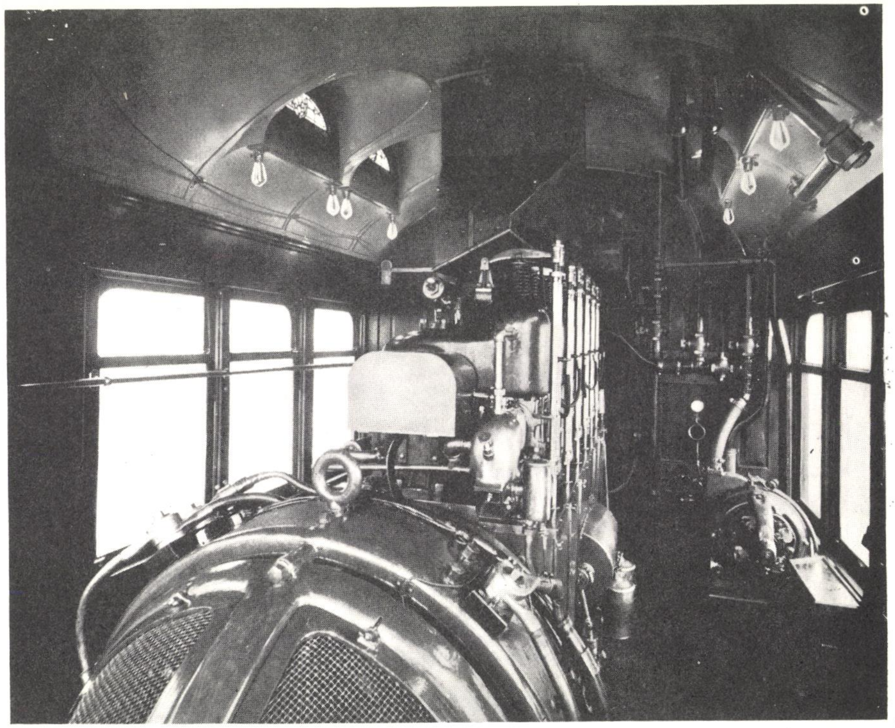


Steel Car for Strang Gas-Electric Operation. Mounted on Brill No. 27-E3 and No. 27-E2 Trucks

It is intended to operate the car on the main steam lines east of the Mississippi River and stops will be made at the principal cities to take aboard parties of railway officials. Another car of similar



Steel Bottom Frame of Strang Car



Interior of Engine Compartment from the Front End

house. By means of the starting rheostat, the current is taken from the battery to the generator, which, being shunt-wound, is temporarily converted into a motor for starting the engine. The fuel and ignition then being turned on, the engine and generator increase in speed to a point where the generator, acting as such, produces an electric current, which, when the car is standing still, will go into the storage battery and be kept in reserve until such time as the motors require more current than is being produced by the generator. The storage battery will then furnish automatically the extra power required for starting, accelerating or climbing grades.

The engine required by this power system is therefore no larger than is necessary for the average load, the storage battery taking care of all variations and carrying the peak of the load in

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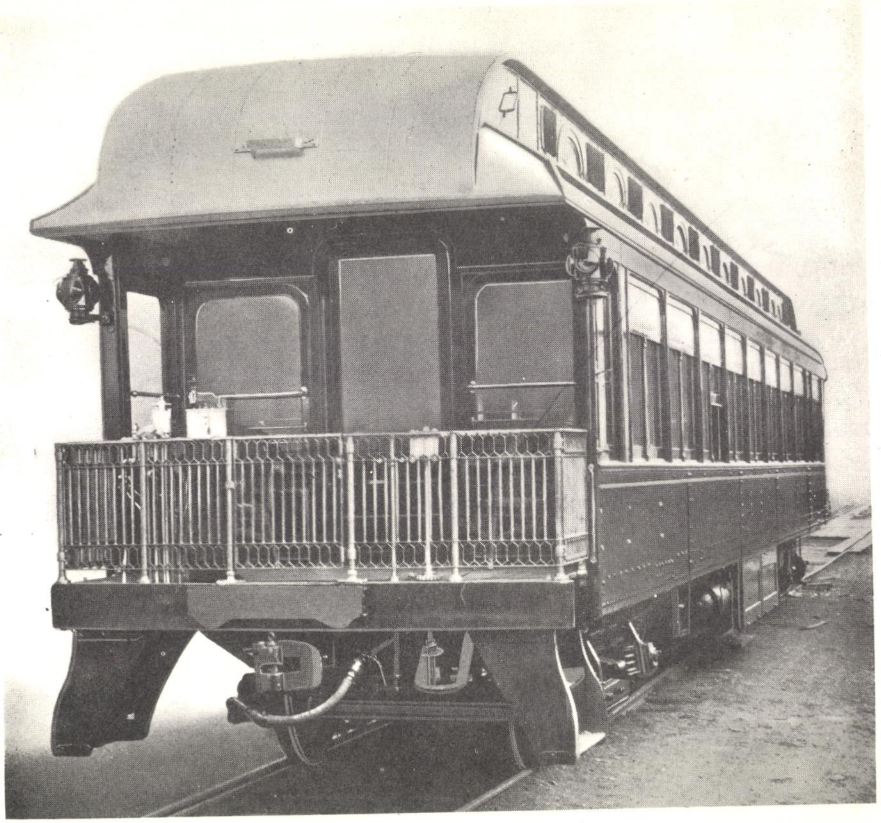


Observation Platform of Strang Car

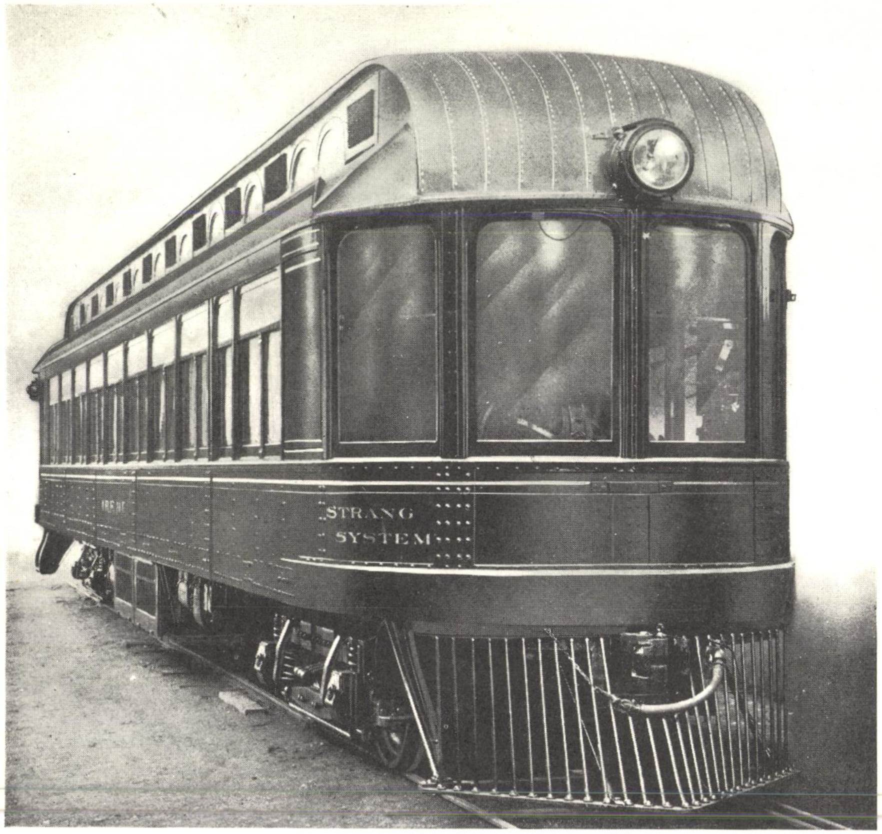
will meet the requirements. The engine practically takes care of itself and what adjustments are necessary are of simple character. Many of the devices which control the machinery have been specially devised and are important improvements over anything of the kind accomplished before, such as automatic control of the engine by the condition of the battery; roof arrangement for water system of heat radiation; high tension ignition system, etc. The car is capable of maintaining 60 miles per hour and has been run at a higher speed. It carries sufficient gasoline to take it 200 miles and consumes about six-tenths of a gallon per mile. It can be made the motor car of a train and will haul three trailers carrying 75 passengers each.

The engine is of vertical 4-cycle type having 6 cylinders, 10½″ x 9″; 150 h. p. at 425 R. P. M. (continuous rating.) Generator of 85 k. w., 250 volt, d. c., shunt-wound interpole. Motors of 100 h. p. (two); 250 volt series wound interpole; both motors are on the forward truck. The battery consists of 112 cells and has a capacity of 300 ampere hours. Type "M" system of control and automatic air brakes are employed. The cooling and heating system consists of an electrically driven centrifugal pump which circulates jacket water through radiators on the roof and, when desired, through heating pipes in the passenger compartment. The car body was designed by W. B. Strang, president, and L. G. Nilson, chief engineer of the Strang Gas Electric Car Company; the engine and accessories were designed by L. G. Nilson, and the generators and motors were designed and built at the Strang Company's shops under the personal supervision of Messrs. Strang and Nilson.

The Missouri & Kansas Interurban Railway was the first line to be operated by Strang Gas-Electric cars and employs this system exclusively. Three motor cars have been in continuous use for two years hauling trains of two cars in regular service. This line starts at Kansas City where it connects with the city railway system, and

THE SANTA FE TRAIL HALL
CLUBS & PRIVATE PARTIES ONLY

A Station on the Missouri & Kansas Interurban Railway

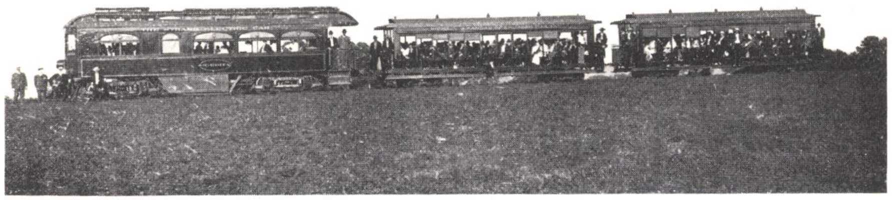


Front End of Strang Car

exactly the same manner as the batteries do in all first-class power houses to-day. Advantages of this combination are that it puts each element exactly where it belongs under normal working conditions and enables the engine to work with great economy at a virtually constant speed.

Without going into technicalities, it may be briefly stated that electric transmission of power to railway trucks is the most efficient, elastic, and simple method of operation. Its elasticity is a most important factor in relation to starting a heavy car.

Only one operator is needed for the car, and he need not be a skilled engineer — any intelligent person of the motorman class



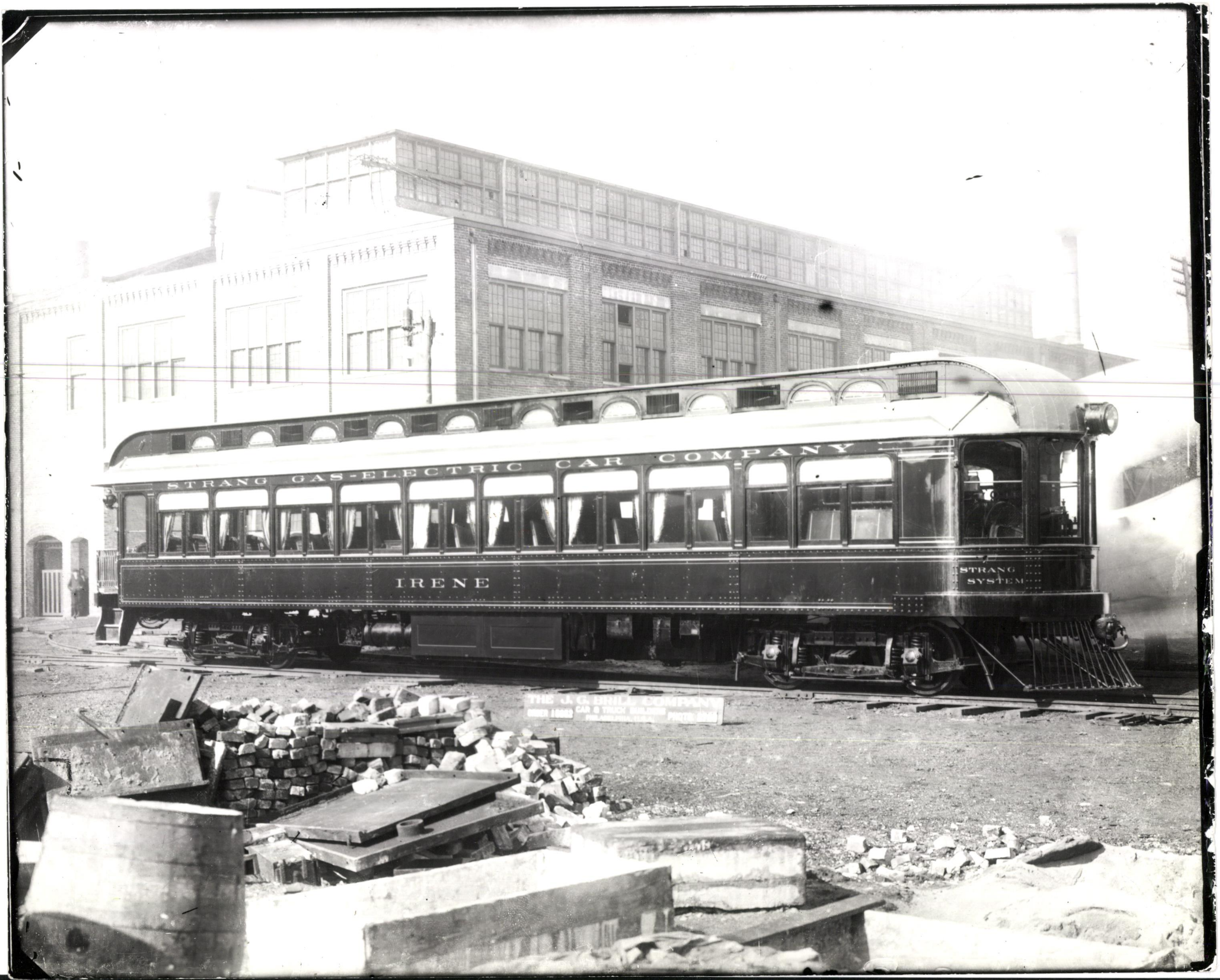
The First of the Strang Motor Cars Hauling Trailers on the Lines of the Missouri & Kansas Interurban Railway

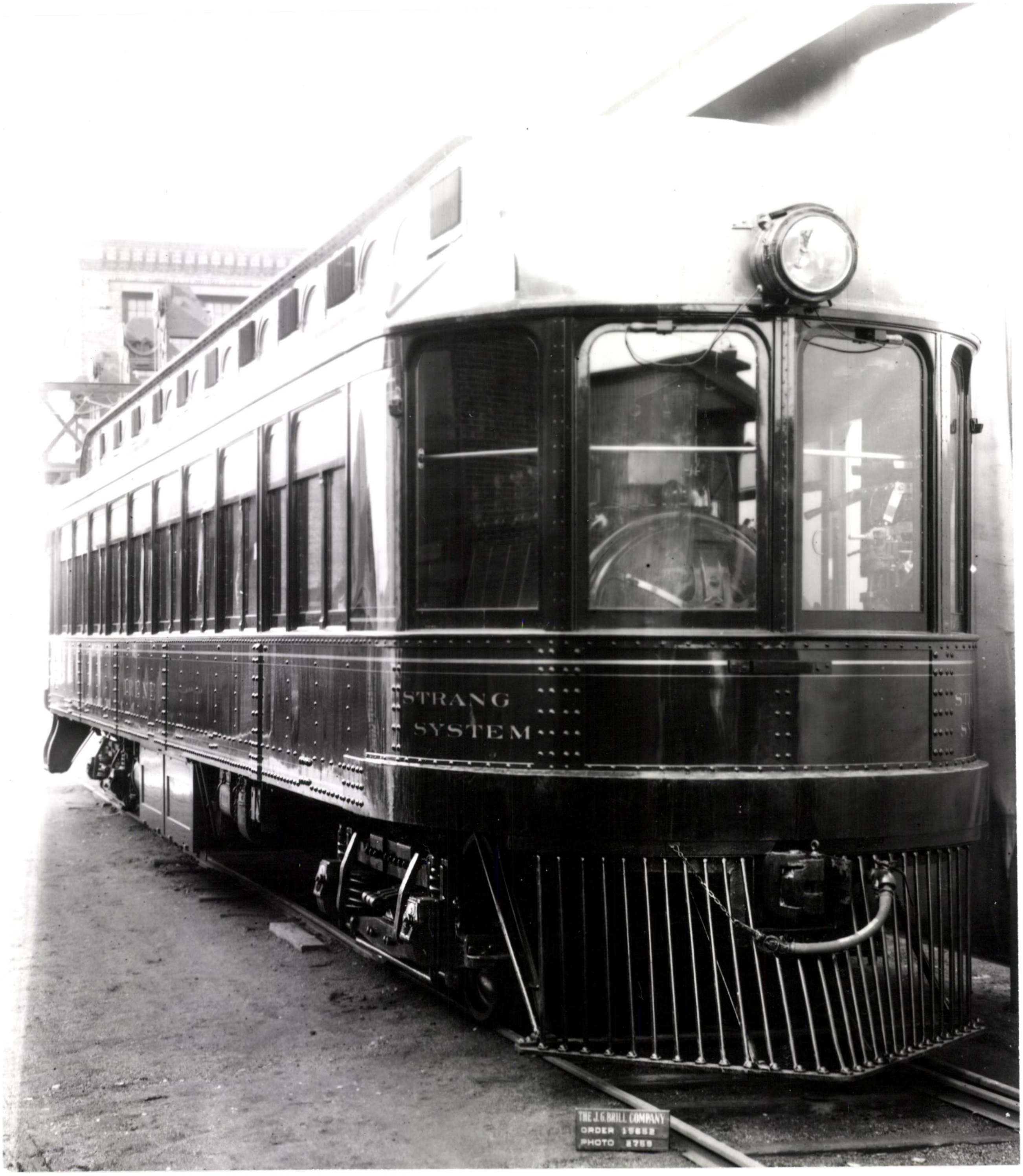
extends along a ridge over what was formerly the famous Sante Fe Trail, to Olathe, a distance of 22 miles, traversing a fertile, prosperous and rapidly developing farming country. Town sites have been laid out at various points along the route and handsome stations have been built. The development of the rich coal, oil and gas districts of Southeastern Kansas has caused a chain of interurban roads to be built from that section to Kansas City and the final connecting link was formed by the construction of the Missouri & Kansas Interurban Railway which commands the only entrance into Kansas City from this quarter. The track is single and of standard gage with necessary sidings and turn-outs and is laid with 70-lb. rails. The roadbed is of substantial construction and, with the exception of short sections in two of the towns along the route and within the corporate limits of the terminal cities, the line passes over a private right of way 80 ft. in width.

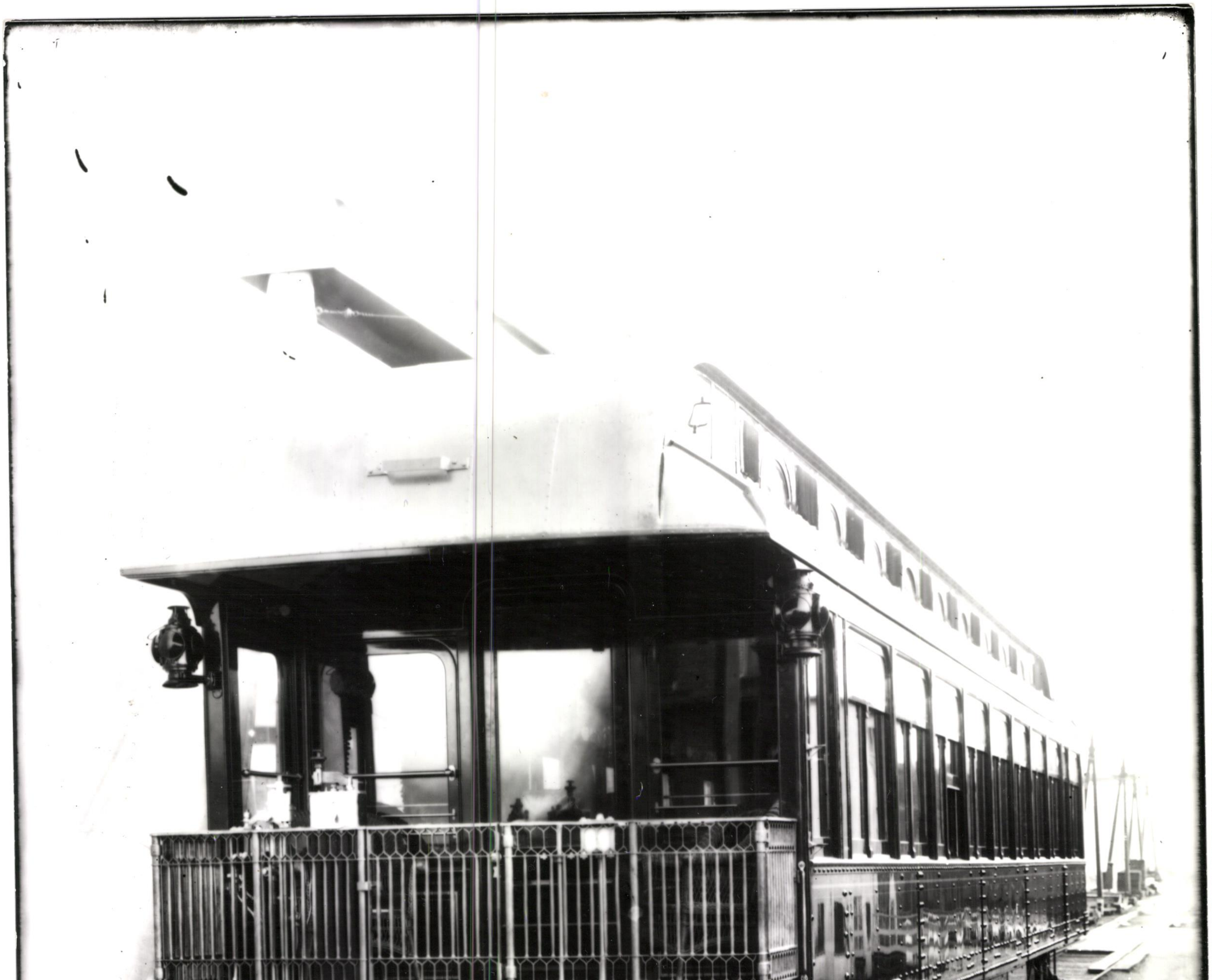
ETW 12-5-1908

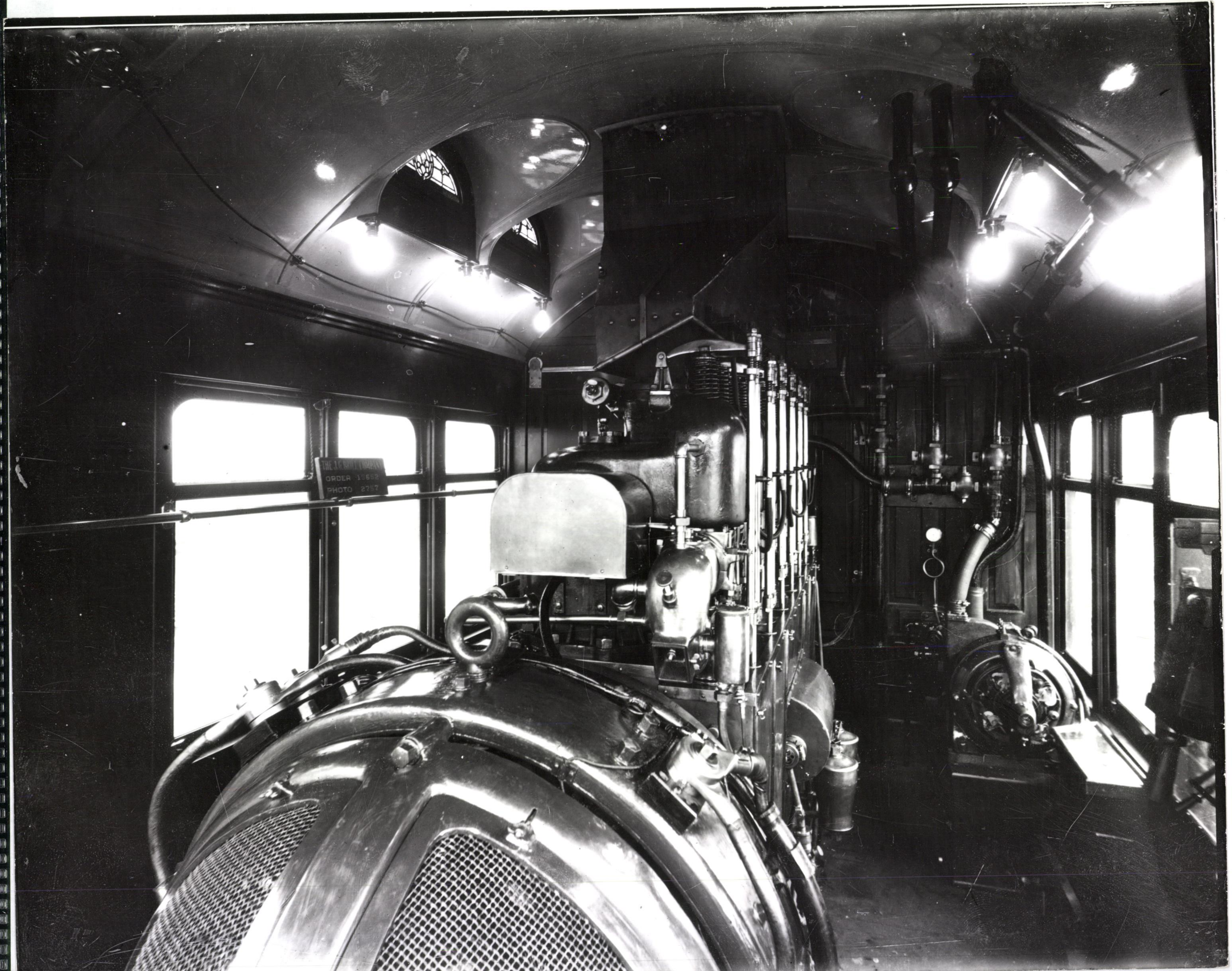
Chicago & Alton to Try Out Gasoline Motor Car

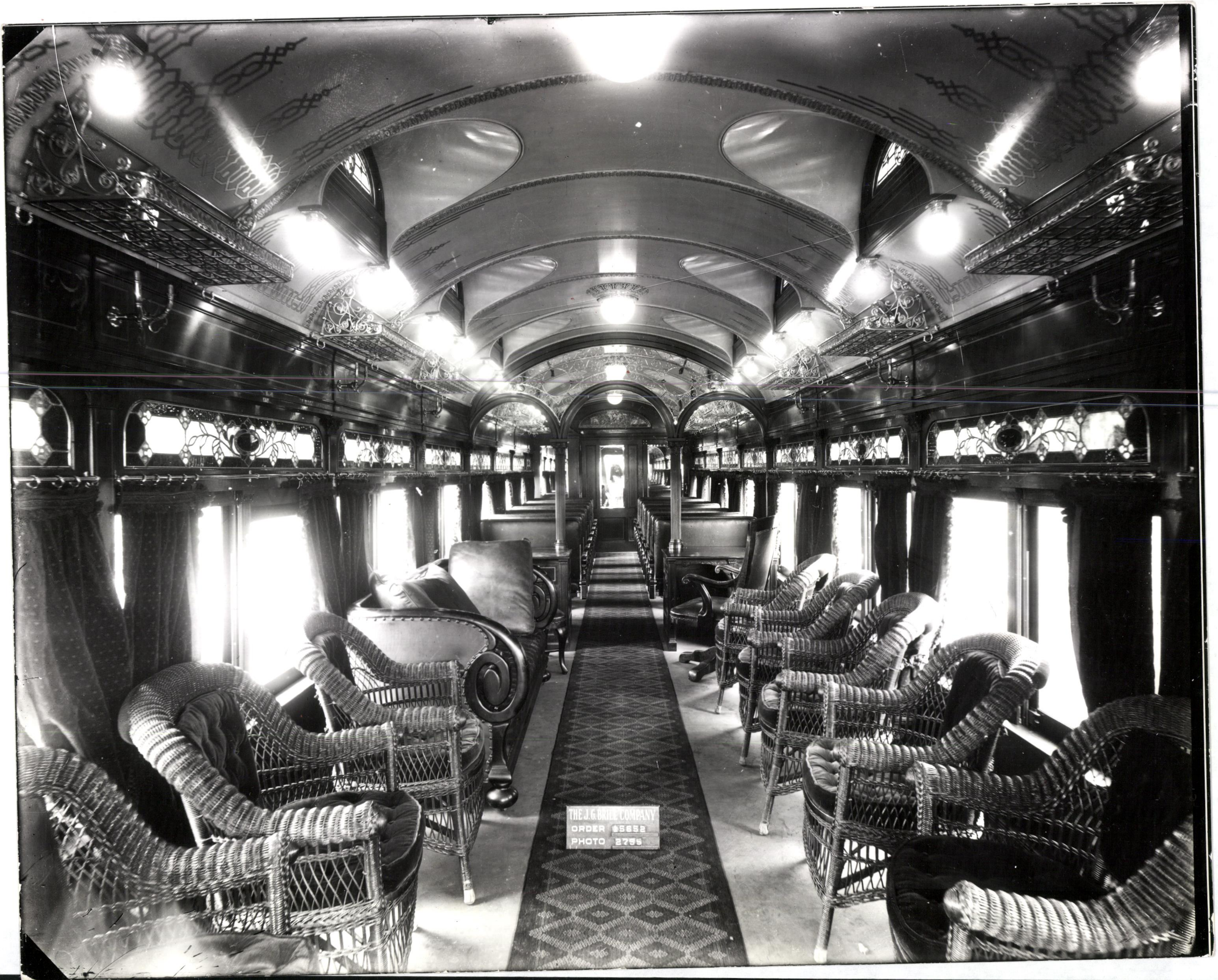
With a view of investigating thoroughly into the possibilities of the gasoline motor car for service on branch lines and where the traffic does not warrant frequent service, the Chicago & Alton Railroad Company is conducting a three weeks' trial trip of a new car, built by the Strang Gas-Electric Car Company, of New York, over its lines in southern Illinois. The car, the "Irene," left Chicago on Monday morning with a party of officials of the Alton and J. K. Duffy, vice-president, and L. G. Nilson, chief engineer of the Strang company, on board. The car, which is the fourth turned out by the company, is built with an all-steel frame, is 62 ft. long and weighs 57 tons. The interior is divided into three compartments, the first containing a six cylinder 150 h. p. gasoline unit which generates current for the motors; the second a passenger compartment fitted with leather upholstered cross seats, and the third an observation compartment with armchairs and couches. The surplus of power over that required for ordinary operation is accumulated in a storage battery underneath the car and is utilized in negotiating a heavy grade or when additional speed is desired. The storage battery is also intended to play an important part in case of accident to the engine, the claim being made that on it alone the car can be run from 10 to 14 miles, sufficient to get it to the next station or siding. A storage tank placed underneath the car carries a supply of gasoline sufficient to take the car 200 miles. The trip from New York was made over the Lehigh Valley and Erie railroads, the car making the entire distance under its own power. During the trip, it is stated, a speed of 60 m.p.h. was attained.

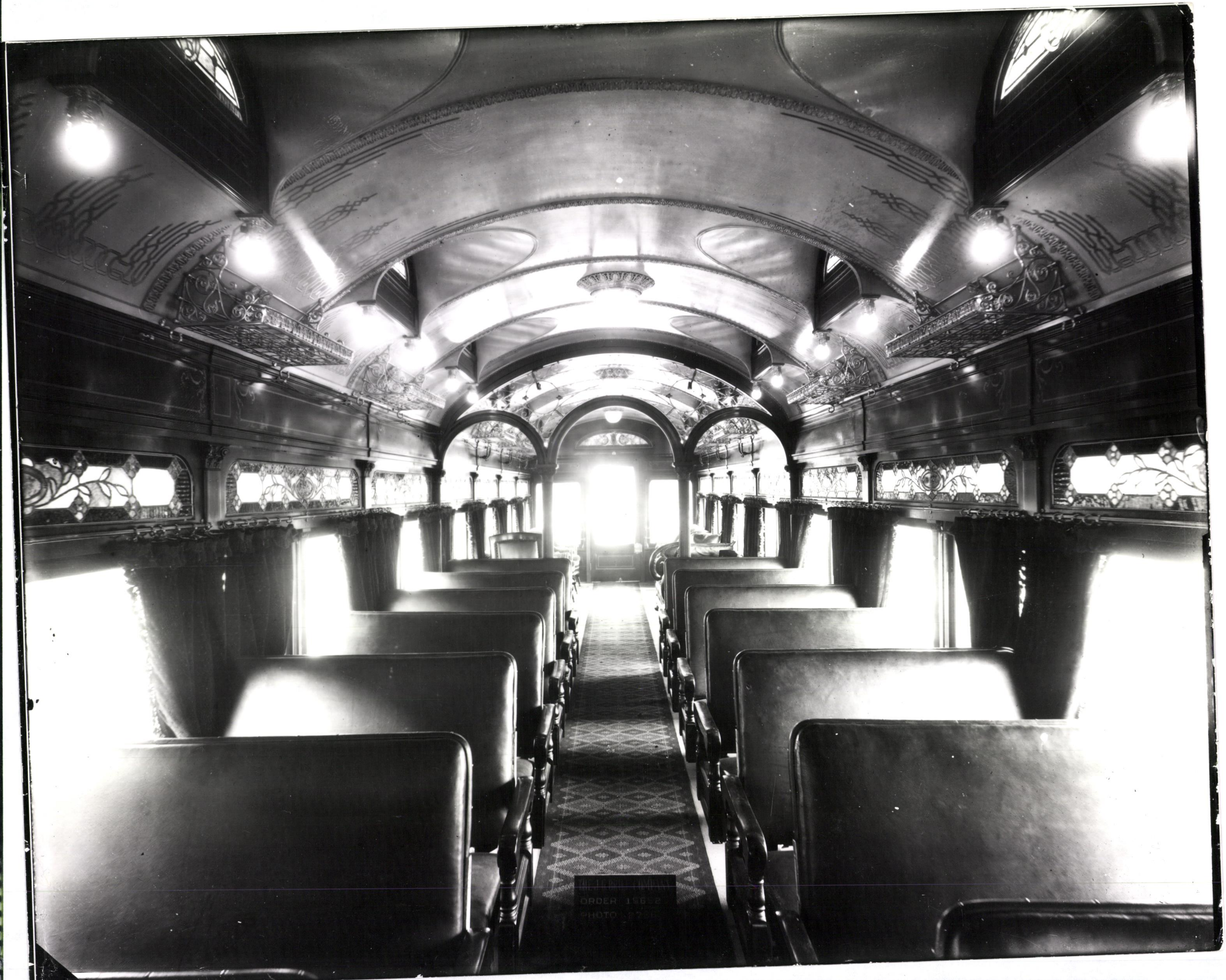

STRANG GAS-ELECTRIC CAR COMPANY
IRENE
STRANG SYSTEM
THE J. G. BRILL COMPANY
ORDER 16662
CAR & TRUCK BUILDERS
PHILADELPHIA, U.S.A.
PHOTO


STRANG
SYSTEM
THE J. G. BRILL COMPANY
ORDER 15652
PHOTO 2759


THE J. G. BRILL COMPANY
ORDER 15652
PHOTO 2758


THE J. G. BRILL COMPANY
ORDER 13652
PHOTO 2757


THE J.G. BRILL COMPANY
ORDER 15652
PHOTO 2755


COMPANY
ORDER 15652
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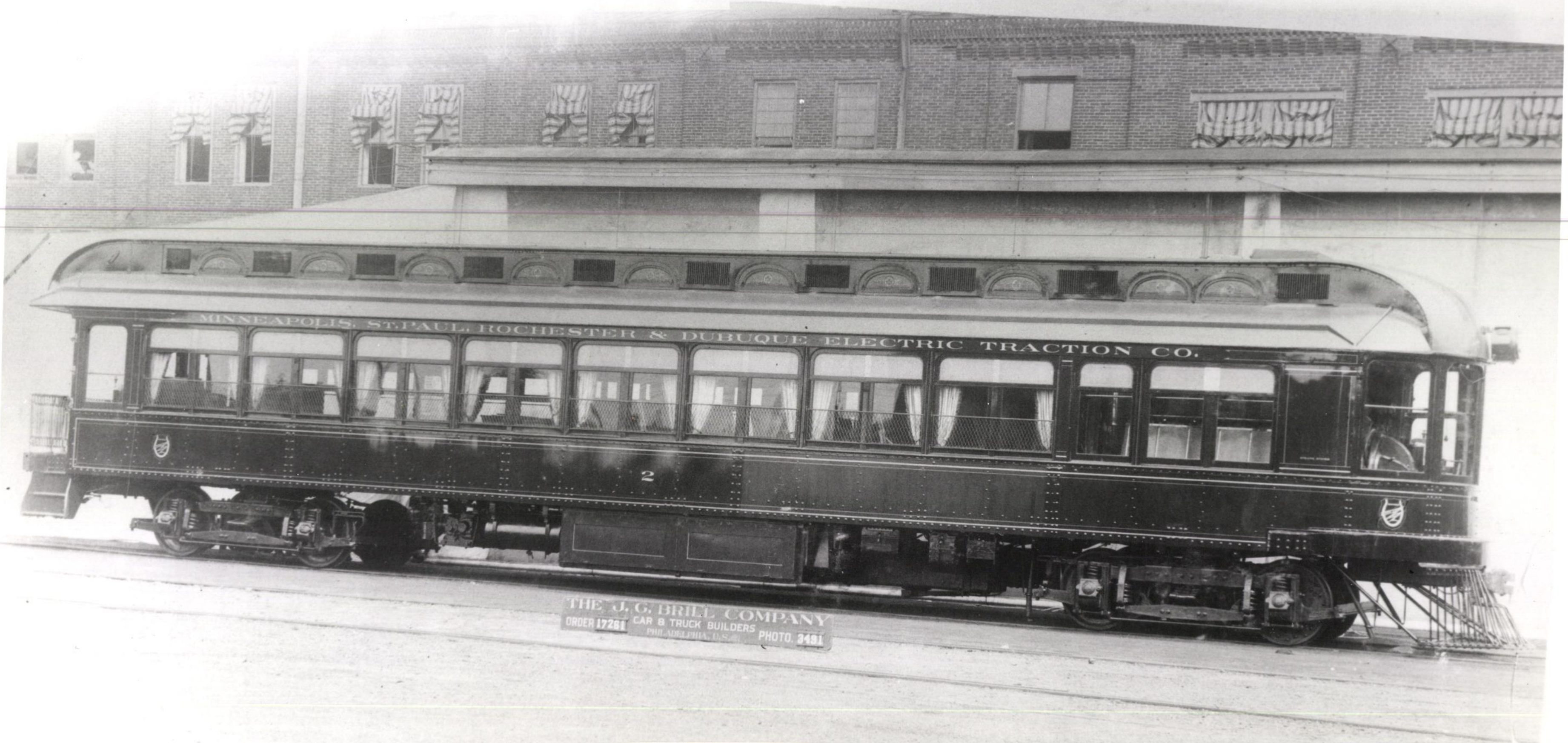
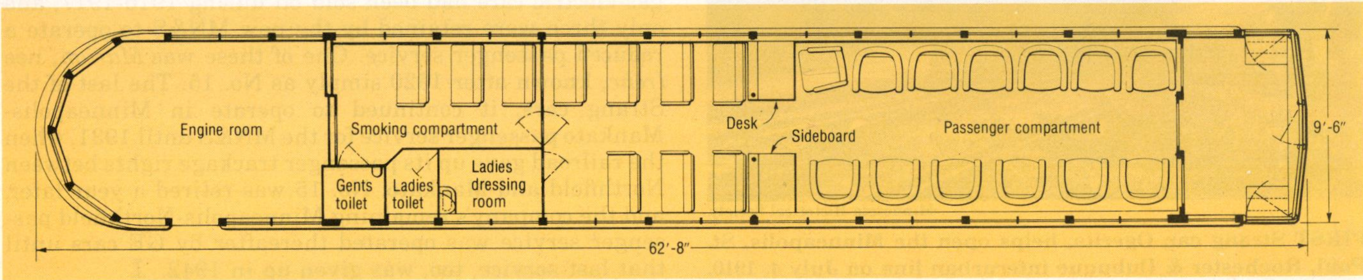
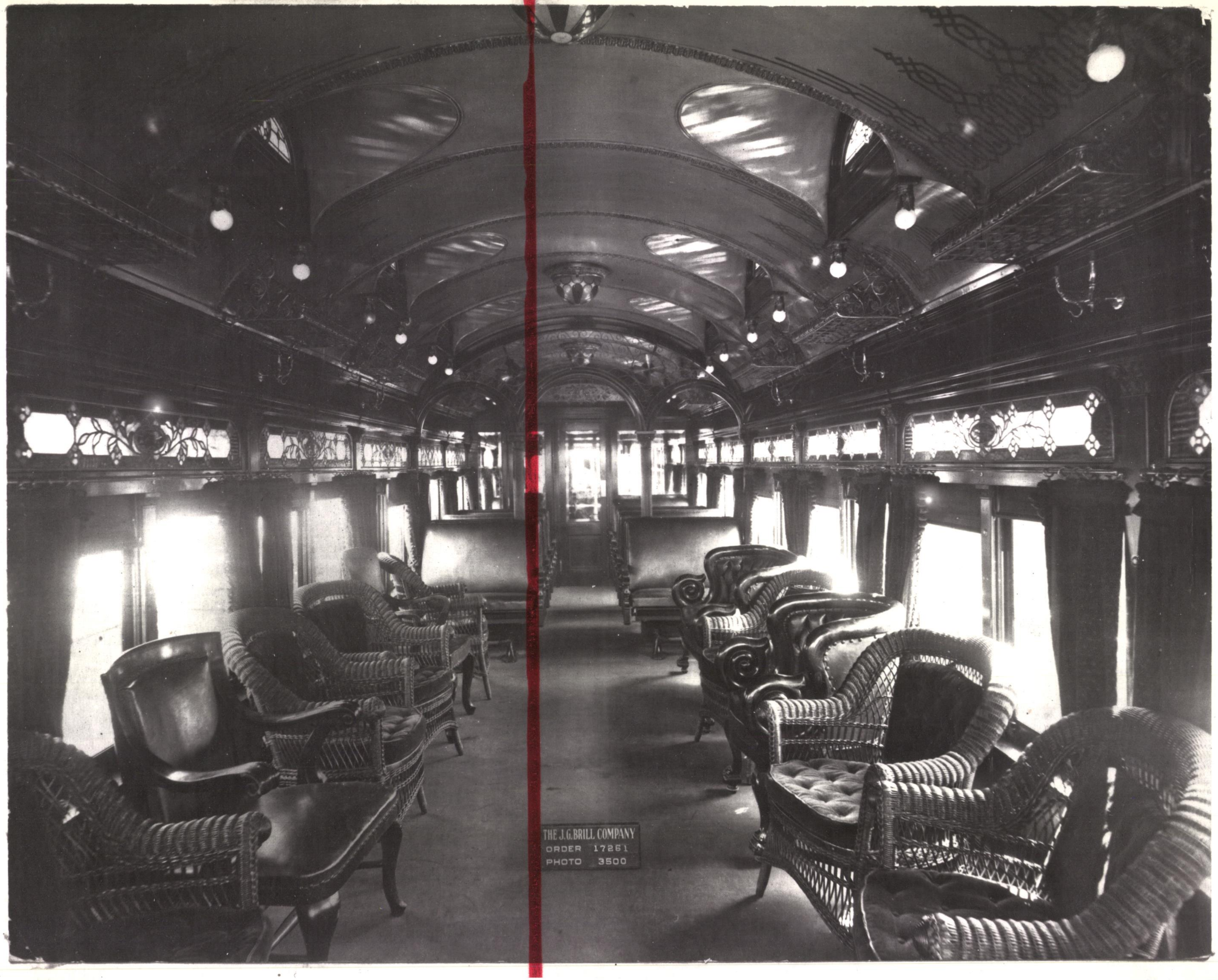
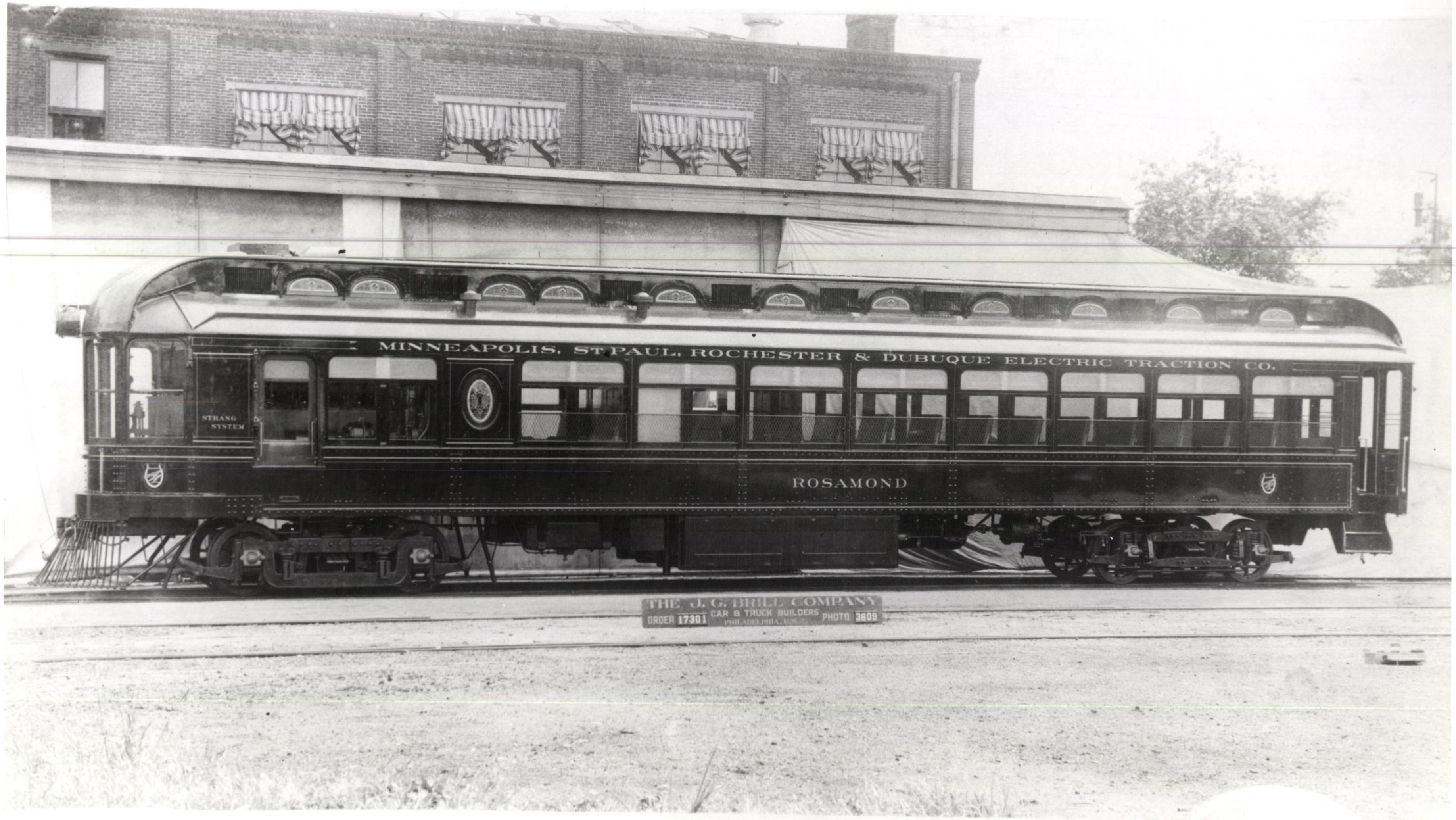

MINNEAPOLIS, ST. PAUL, ROCHESTER & DUBUQUE ELECTRIC TRACTION CO.
2
THE J. G. BRILL COMPANY
ORDER 17261
CAR & TRUCK BUILDERS
PHILADELPHIA, U.S.A.
PHOTO 3491


Engine room
Smoking compartment
Gents toilet
Ladies toilet
Ladies dressing room
Desk
Sideboard
Passenger compartment
9'-6"
62'-8"

AVERY®
PV119ED


THE J.G.BRILL COMPANY
ORDER 17261
PHOTO 3500


MINNEAPOLIS, ST. PAUL, ROCHESTER & DUBUQUE ELECTRIC TRACTION CO.
STRANG SYSTEM
ROSAMOND
THE J. G. BRILL COMPANY
ORDER 17301
CAR & TRUCK BUILDERS
PHILADELPHIA, U.S.
PHOTO 3608

STRANG GAS-ELECTRIC CARS ON THE DAN PATCH ELECTRIC LINE

The issue of Electric Traction Weekly dated April 8, 1911, reported that the line's initial equipment were three Strang cars: one 36 ft. car OGERITA, and two 62 ft. cars IRENE and ROSAMOND.

#1 OGERITA

OGERITA had been delivered in June 1910 and entered service during July 1910. As business improved the car's limited seating capacity was a severe handicap. When Antlers Park was electrified during 1912 this car was spotted on a siding at the park and its machinery used to generate electricity for the park. The car was reported as Retired during 1914.

#2 IRENE

Under J.G. Brill Co. order no. 17261 part of the forward coach section was partitioned off to provide a smoking compartment and separate ladies' toilet-dressing room. The builder's photograph shows the car with the numeral 2 painted on the sides, but the name IRENE does not appear. However the name was listed in the company records. The car was delivered in June 1910.

We don't know if #2 was used in regular daily service at first; it was frequently used as a private car by Col. Savage transporting visitors to and from his stock farm. In a subsequent lawsuit brought by a disgruntled shareholder criticism was made of $12,000 being spent for Col.Savage's private car.

The Electric Traction Weekly issue dated April 8, 1911, reported that IRENE was now used in regular service. Had been in constant service for six months averaging 175 miles per day without missing a trip.

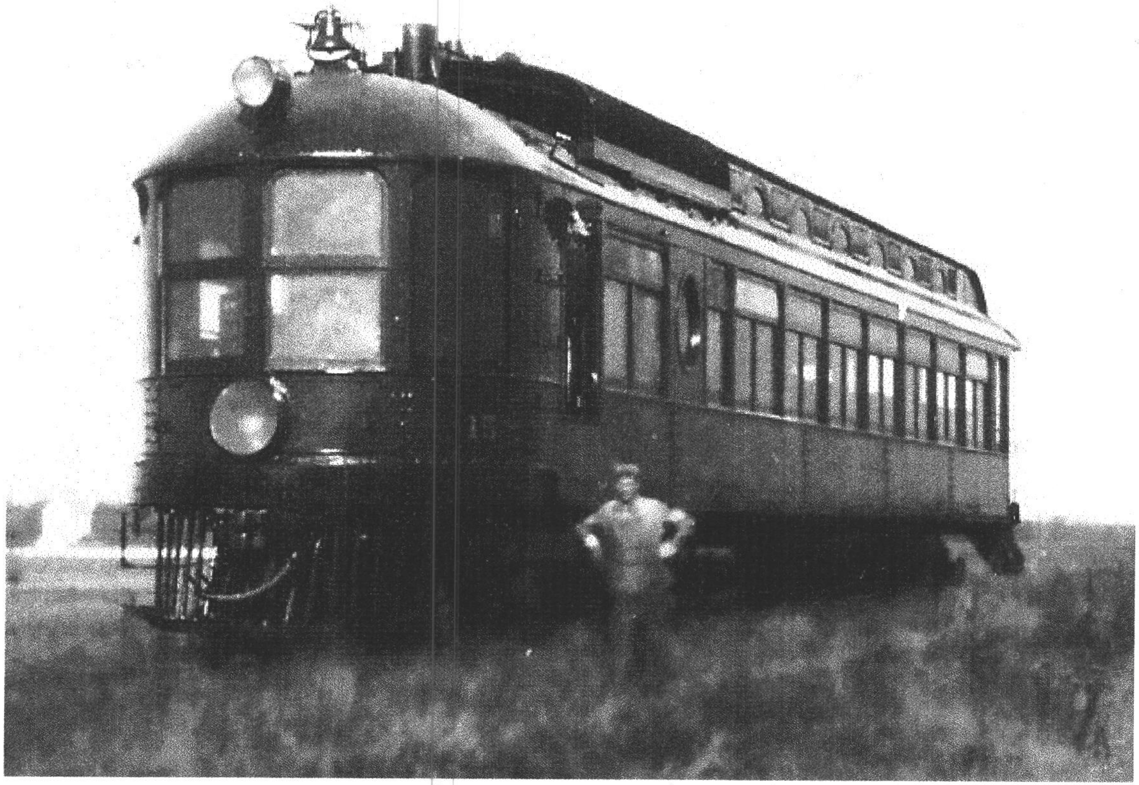
In May 1913 the car was re-equipped by General Electric Company with a G.E. GM-16C1 engine, generator, Wason RM54B trucks and two G.E. 205D traction motors. Weight was reduced to 101,500 pounds. Seating capacity was 48 persons. G.E. assigned serial number 3764 to the re-powered car which traveled to and from G.E.'s Erie, Pennsylvania, plant under its own power. DPEL records list the cumulative cost of the car as of 6-30-1913 at $22,221.58. Renamed MARION after Col. Savage it was used as the parlor car on the Minneapolis-Mankato limited runs.

During June 1915 it was renumbered 15. The car was acquired by the MN&S Ry. with the purchase of the railroad in 1918.

1st#3 ROSAMOND

The J. G. Brill Company builder's photograph for order no. 17301 shows the name lettered on each car side but no road number. This is opposite the situation with IRENE. The photograph also shows cab lettering "Strang System", which does not appear on IRENE. The car was delivered in June 1910. DPEL records show the cost of 1st#3 prior to 6-30-1911 at $13,265.66.

Electric Traction Weekly issue dated April 8, 1911, reports the car was "accidentally destroyed by fire a few weeks ago".



#15 1920 Ex IRENE

AS REBUILT BY GEN. ELEC. CO.
WASON TRUCKS G.E. MOTORS

GENERAL ELECTRIC CO.
GAS-ELECTRIC PASSENGER CARS

In 1904 the General Electric Co. undertook its gas-electric motor car design. The first experimental car, G.E. demonstrator #1, was completed in February, 1906. The second and third cars, G.E. demonstrator #2 and demonstrator #3, were completed in December, 1907, and May, 1909, respectively. A standardized line of cars, with G.E. power and control equipment installed in carbodies and trucks made by the Wason Manufacturing Co., Springfield, Massachusetts, was offered beginning February, 1911.

(Demonstrator #3)

A G.E. demonstrator just arrived from Schenectady, N.Y., made the first official trip over the new line from 50th St., Minneapolis, to Savage on July 2, 1910. G.E. demonstrator #2 was photographed in Northfield during December, 1910. George O'Rourke, a G.E. sales engineer, accompanied GE 2. (He later left G.E. to become MStPR&DET Co. mechanical superintendent and subsequently general superintendent.) G.E. demonstrator #3 was photographed on Nicollet Ave. during May or June, 1911.

G.E. Demonstrator #2

This was the first car with the carbody built by Wason Manufacturing Co. (December, 1907), Type RE50B5. American Locomotive Co. trucks with 6' 4" wheelbase and 36" wheels were used. The GM-10A1 gasoline engine was a 90 h.p. V-8, started by hitting a black powder cartridge with a hammer. It was equipped with a 90 KW main generator, 3.5 KW exciter generator, 15 point controller, and one G.E. 72A traction motor mounted on the inner axle of each truck. Weight was 32 tons. The interior was finished in Mexican mahogany and fitted with green leather seats seating 44 persons.

This car demonstrated on many railroads, including the Dan Patch Electric Line. According to the "Electric Traction Weekly" previously mentioned, when "ROSAMOND" was destroyed by fire "since then the service has been filled by an experimental car built by the General Electric Co.". The description of the car indicates it was GE 2. The article further reports "The G.E. car which has been handling the service during the past three months has been making two round trips daily." This explains why the car was listed as being in service on the Dan Patch Electric Line since December, 1910.

Later in 1911 GE 2 was involved in a head-on collision with a steam locomotive on the Rapid City, Black Hills & Western Ry. Both GE 2 and GE 3 spent time on the RCBH&W Ry. and were even listed as being owned by them. However GE 2 was returned to General Electric Co. after the collision and the wreck damage was repaired during November, 1911. At that time G.E. assigned serial number 3720 and road number 7 for stock car #7. It appears that this car was purchased by the MStPR&DET Co. during 1912 as its second #3, [redacted] The car was destroyed in the 60th St. paint shop fire November 19, 1914.

AVERY®
POLY VU

"Dan Patch News"
Volume 1 Number 10
December 1912

New Equipment

"In placing an order for equipment a remittance accompanies the order so that a better price can be procured and the order receives precedence over others. All of our equipment is especially manufactured for us and before it is delivered it is subjected to every possible test to prove its efficiency. Our 72-ft. all-steel cars are the product of the General Electric Co., the largest builders of motor cars in the world. Our power cars cost us an average of $25,000 per car, but they are truly the last word in carbuilder's art---the most modern cars that have so far been devised."

"The company now owns nine all-steel power cars and five trailers. Of these three power cars and three trailers have been added during the past year, together with a great deal of freight equipment. The passenger and freight carrying capacity of the road was sorely taxed during the past summer and it will be necessary to add to the equipment early during the coming season." (The general manager, in a separate report, wrote "this greatly increased business has been handled by the addition of but two more gas-electric motor cars and three trailer cars over the number owned in July, 1911.")

Roster of G.E. Gas-Electric Passenger Cars

G.E.'s car type designation is used in this roster.
    CE or RE: center entrance or rear entrance.
    Overall length to the nearest foot.
    B: Baggage compartment.
    Length of baggage compartment to nearest foot or half-foot.
All cars were also divided into passenger and smoking compartments.

No.	G.E. Serial No.	Wason Order No.	Date Built	Type	Engine	Motors	Seats	Weight	Note
4	3709	10270	5-11	CE58B8	GM-16A1	2 GE 205B	47	41 tons	1
5	3710	10270	5-11	CE58B8	GM-16A1	2 GE 205B	47	41 tons	
6	3704	9780	2-11	RE57	GM-10B2	2 GE 205B	88	39 tons	2
7	3708	9930	7-11	RE57B6	GM-16A1	2 GE 205B	75	40 tons	
8	3706	9781	?-11	RE67B11	GM-16B	2 GE 205D	88	45.5 tons	3
9	3735	12050	5-12	RE70B11	GM-16A5	2 GE 205D	91	49 tons	
10	3736	12050	5-12	RE70B11	GM-16A5	2 GE 205D	91	49 tons	
11	3766	13700	8-13	RE70B11	GM-16C1	2 GE 205D	69	51.5 tons	
12	3767	13700	8-13	RE70B11	GM-16C1	2 GE 205D	69	51.5 tons	
13	3789	16500	7-15	RE70B11	GM-16C5	2 GE 205D	69	51.5 tons	
14	3790	16500	8-15	RE70B11	GM-16C5	2 GE 205D	69	51.5 tons	

(1) The GM-16 engine was a 175 h.p. V-8 with 8" x 10" cylinders, operated at 550 r.p.m. and started by compressed air. An auxiliary GM-24 engine, two cylinders, 10 h.p., was used to drive a 1.5 KW lighting generator; a third cylinder integral with the engine was an air compressor supplying air to start the main engine. The 100 KW main generator supplied electricity to the two 100 h.p. traction motors mounted on the front truck. The Wason Mfg. Co. RM54B trucks had 33" wheels. The front truck wheelbase was 6' 6" on cars 4-7 and 6' 10" on cars 8-14. Rear truck wheelbases were 5' 6" and 6' 0" respectively.

(2) This car was GE 4, a production car built for stock in February, 1911, which was also used as a demonstrator. The MStPR&DET Co. purchased this car in June, 1911. The engine was a 125 h.p. V-8 started by compressed air, directly connected to an 80 KW main generator. An auxiliary one cylinder 4 h.p. engine drove a small air compressor to supply air for starting the main engine. Car lighting power came from a 3.5 KW exciter integrated with the main generator.

(3) This car was G.E. stock car #6, built sometime during April-May-June, 1911. The MStPR&DET Co. purchased the car in March, 1912.

Disposition of the G.E.
Gas-electric Cars

Number 7 was damaged in a head-on collision with gas-electric locomotive 100 in 1914. It was rebuilt into Mail-Baggage Trailer number 200 with a 15 ft. mail compartment and 25 ft. baggage compartment.

Two cars, 13 and 14, were purchased with the railroad by the MN&S Ry. in 1918.

During the receivership eight cars had been sold, six during 1916 and two during 1917. Details follow.

Number 4: John Ringling, owner of the Ringling Brothers Circus, also owned and operated several short line railroads. Equipment for these railroads was bought and sold through the Western Locomotive & Car Co., Chicago, also owned by Ringling. This car was sold in 1916 to the latter company, which then leased it to the Oklahoma, New Mexico & Pacific Ry. (Ringling owned) as their #1 in December, 1916. Refer to the disposition of number 10.

Number 5: Sold 1917 to the Okmulgee Northern Ry., Oklahoma, as their #110. Re-sold in 1924 to the Jonesboro, Lake City & Eastern R.R., retaining the same number. Re-sold 11-1-1925 to the St.Louis-San Francisco R.R. as their 3rd 2117. Scrapped May, 1935.

Number 6: Sold in 1916 to the Warren & Ouachita Valley R.R. as their #4. Subsequently converted into a Trailer.

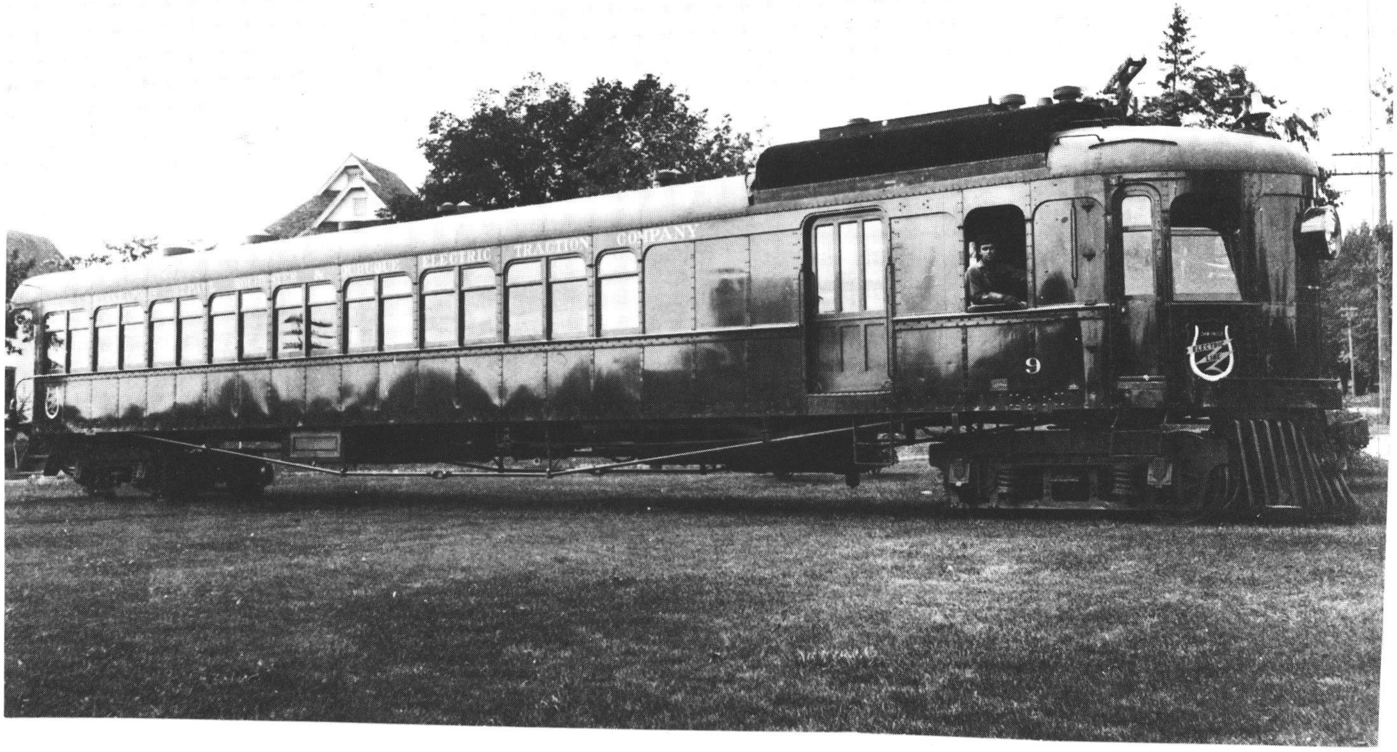
Number 8: Sold 4-12-1917 to the Spokane, Portland & Seattle Ry. as their #1102. Re-sold 9-10-1924 to the Warren & Ouachita Valley R.R. as their #1. Subsequently converted into a Trailer.

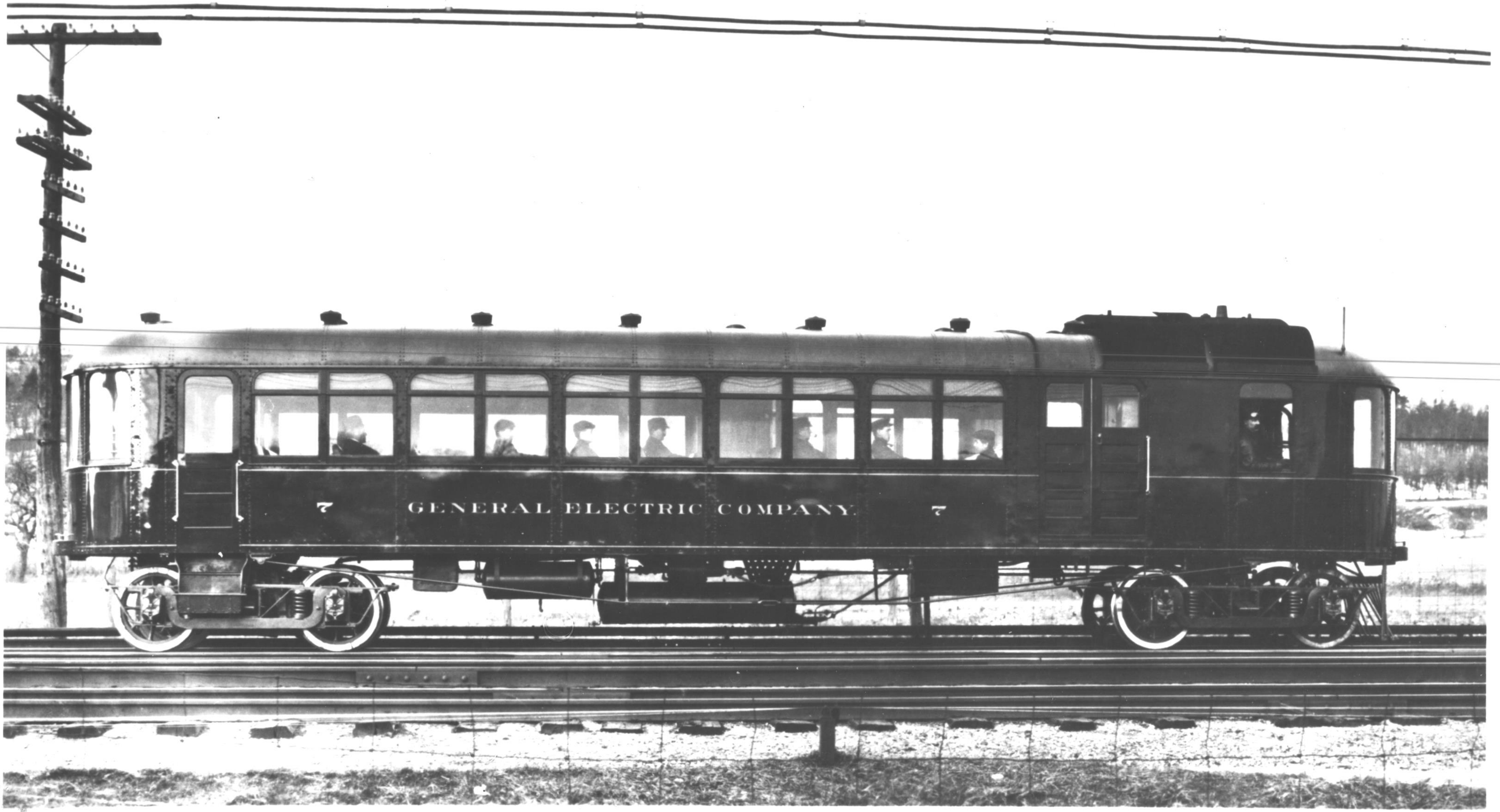
Number 9: Sold 11-14-1916 to the Visalia Electric R.R., Visalia, California, as their #450. Re-sold 6-14-1921 to the Northwestern Pacific Ry. as their #900. Re-engined with a Sterling 225 h.p. diesel, resulting in a flat front end, but retaining the original trucks and traction motors. Re-sold 12-5-1938 to the Southern Pacific Ry. Rebuilt by the S.P. Ry. during December, 1939 at their (Sacramento) (West Alameda) shops as a self-propelled Wrecker for San Francisco-Oakland Bay Bridge operation, #MW-01. Owned 50% by Railway Equipment & Realty Co. Ltd. (holding company for Key System Ltd. and Key Terminal Ry.) and 50% by the S.P. Ry. until 1943 when RE&R purchased SP's share. Retired 1947 and scrapped 1948.

Number 10: Sold 1916 to the Oklahoma, New Mexico & Pacific Ry. as their #5. Re-sold 1923 to the Midland Valley Ry., Wichita, Kansas, as their #M-6. (James Buckley earlier had said 1927, entering service in February, 1928.) The MV Ry. leased the car for a while to the Kansas, Oklahoma & Gulf Ry., which they controlled, being renumbered M-22. During 1939 the body of #M-6 and the machinery from #M-8, another G.E. gas-electric passenger car, were combined to produce the second M-6. The machinery from #M-6 and the body of #M-8 were scrapped in 1939. Second M-6 was sold for scrap in November, 1954.

Numbers 11 and 12: Sold December, 1916, to the San Diego & Southeastern Ry., California, as their numbers 41 and 42 respectively. #41 was scrapped in 1939 and #42 in 1940.

42 dismantled 1939; body made into a field office 1940.




7
GENERAL ELECTRIC COMPANY
7

209023 GASOLINE ELECTRIC CAR #7.

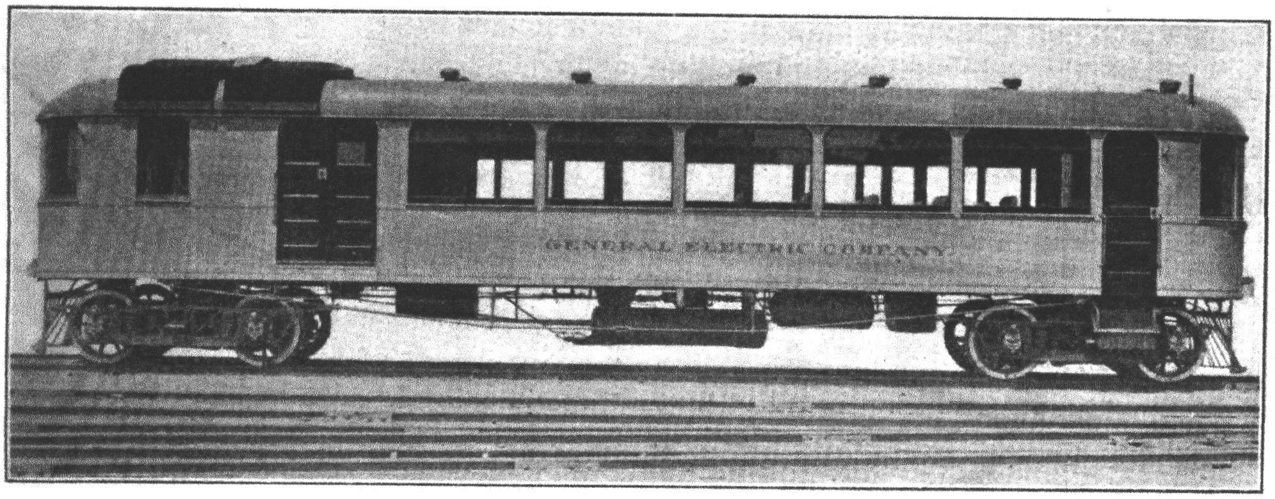
GASOLINE-ELECTRIC MOTOR CAR FOR DELAWARE & HUDSON RAILROAD

A test run was made Jan. 15 of the new gasoline-electric car designed and built by the General Electric Company for the Delaware & Hudson Railroad. The car differs radically from the earlier gasoline-electric car built by the same company some two years ago and described in these columns.

The car body is of the combination type, and comprises one ordinary passenger compartment, a smoking room, baggage room, engine room, toilet and observation compartment. The car is single-ended, having the controlling apparatus situated in the engine room. The principal dimensions are as follows:

Length over all, 50 ft.
Length of engine room, 9 ft. 6 ins.
Length of baggage room, 5 ft. 8 ins.
Length of smoker, 7 ft. 11 ins.
Length of passenger compartment, 18 ft. 6 ins.
Width over all, 8 ft. 8 ins.
Height over all, 12 ft. 10½ ins.
Seating capacity, 44.
Total weight of car and trucks fully equipped, 31 tons.

This car was designed throughout with special reference to the service required, the main object in view being to secure the maximum carrying capacity, with a minimum weight, and at the same time to have a car of great strength. The shape of the ends is parabolic in order to reduce the air resistance to a minimum when traveling at high speed. The general shape of the car will be seen by reference to the illustration. The frame work of the roof and sides is made of T irons bent to the required shape and braced diagonally. The exterior of the car is of steel plate, while the interior is finished with selected Mexican mahogany. No wood is used in the engine compartment. The floors of the passenger and baggage compartments consist of two layers of wood with paper between, armored on the under side with steel plates. The roof, which is fireproof, is of a plain oval shape; the monitor construction was not employed, as it would have added needlessly to the weight. Special attention has been paid to ventilation; 12 ventilators of the globe suction pattern are furnished in the roof. The under framing is of a very rigid construction; the center sills consist of 6-in. "I" beams, and the outside sills are 6-in. channels, and these are braced diagonally to lend greater rigidity.



SIDE VIEW OF GASOLINE-ELECTRIC MOTOR CAR

The seats are handsomely upholstered in green leather. The interior is lighted with individual lamps, there being one light for each seat in addition to those in the vestibule, toilet and engine room, while a head-light is also provided. The steps are arranged in such a manner that the bottom one folds up automatically as the vestibule door is closed. The car body was built by the Wason Manufacturing Company, Springfield, Mass., in accordance with the designs of the General Electric Company.

GENERAL SCHEME OF OPERATION.

The gasoline engine is direct-coupled to a 90-kw, direct-current generator, which furnishes current at a variable potential. This current is fed to the motors through the medium of the control system by which the voltage of the generator may be governed according to the requirements. The two motors are of the GE-72-A type, each rated at 60 hp.

ENGINE.

The engine was designed and built by the General Electric Company with special reference to the requirements peculiar to gasoline electric cars. Very special attention has been paid to the simplification of the engine; the number of parts and weight have been reduced to a minimum.

When running at 550 r. p. m. the engine develops 100 horse-power and has a greater capacity at increased speeds. There are eight cylinders, each of which is 8 ins. in diameter and has a stroke of 7 ins. The cylinders are placed at 90 degs. to one another, or at an angle of 45 degs. with the vertical. Each cylinder is composed of one piece, being a casting of very soft, fine grain cast iron. Each casting is self-contained and includes the water jacket. It is worthy of note that special attention was paid to provide an extra large cooling surface around the valves to eliminate any excessive temperature at the valve seats. There is one admission and one exhaust valve for each cylinder, which are arranged in such a manner as to permit the inspection of both valves by the removal of two nuts. The pistons are of the trunk type; they are made of cast iron and are rendered gas tight in the cylinders by the provision of three split piston rings. The connecting rods, which are made of chrome nickel steel, are connected to the pistons by means of hollow pins shrunk into the body of the connecting rods. The crank shaft is made in one forging of 40 carbon steel; it is a four-throw crank having

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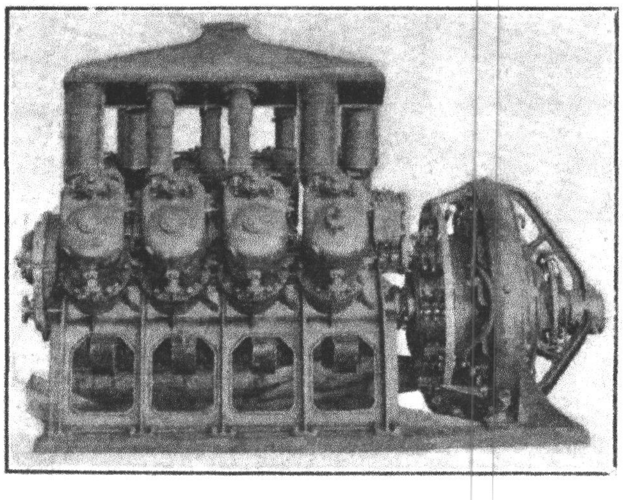
an angle of 180 degs. All of the crank pins lie in the same plane, the two center pins occupying the same angular position while the two outside crank pins are set at 180 degs. to the center crank pins. This arrangement of cranks, with cylinders set at 90 degs. to one another, gives a very satisfactory system for balancing purposes. Two connecting rods are coupled to each crank pin.

Each cylinder is fastened to the engine base by means of six bolts. The engine base proper is made of one casting of Parson's manganese bronze, the form of which is clearly shown in the illustration. The crank casing, which is made oil tight, is of aluminum. All of the valves, both admission and exhaust, are actuated by one cam shaft which is driven from the main engine shaft by two gear wheels with the customary 2 to 1 reduction. This cam shaft is entirely enclosed in a circular tunnel which runs the entire length of the engine base; the tunnel is formed in the main casting. The fact that the valve rods are all operated from this one shaft has greatly simplified the design of the engine. There are two carburetors of the float feed type. The ignition system is of the high-tension type; a separate coil is provided for each cylinder. These coils are energized by means of a small accumulator. The sparking at the correct instant in each cylinder is effected by means of a roller commutator.

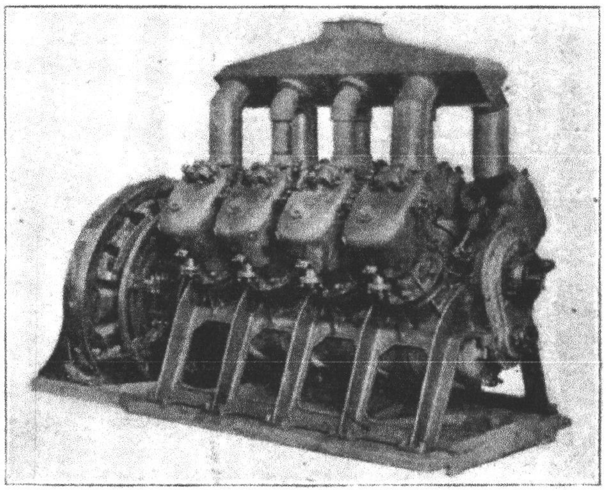
Considerable difficulty has been experienced in starting gasoline engines of this size heretofore, but in the present instance a special breech-block mechanism has been provided which fires a charge of black powder into one of the cylinders, and this has proved a most effectual way of overcoming these difficulties. The cooling system for the cylinders operates on a thermo-siphon principal. The radiator, which is situated on the roof of the car, is divided into four separate nests of radiating tubes; these, being of the spiral-finn pattern, give a maximum cooling area per unit-length.



END VIEW OF ENGINE

The total cooling surface amounts to approximately 1300 sq. ft. Each pair of engine cylinders is connected to one nest of tubes and the four nests are in turn connected by means of three copper pipes. The water jackets are connected to the radiator by means of pipes running vertically from the engine; these pipes pass through the roof and the circuit is completed by means of other pipes leading from the radiator to the cylinder jackets. This system forms the most simple cooling arrangement possible, as it entirely eliminates the necessity of using pumps or cooling fans, and it has the further advantage of being easily drained and of being filled from the side of the car.

It is of interest to follow the course taken by the gasoline from the storage tank to the carburetor. The gasoline is stored beneath the car in a large steel tank having a capacity of 90 gals., and is raised to a small auxiliary tank in the cab by means of a diaphragm pump. The gasoline is filtered in transit from the tank to the pump. The auxiliary tank is provided with a float to register the height of the gasoline, and a glass tube, somewhat similar to a sight feed lubricator, is provided so that the operator can see if the diaphragm pump is working. The gasoline is fed by gravity to the carburetor.



SIDE VIEW OF ENGINE

The oiling system has been very carefully designed. Forced lubrication is used, and for this purpose there is a nest of pumps operated from the main shaft. One pump is provided for each of the main bearings and another oils the cams and cam mechanisms, the duty of this latter pump being to keep the cam shaft tunnel filled with oil; the oil on leaving the tunnel flows over the reduction gears and thence to the crank chamber. All of the oil used for lubricating purposes similarly flows to the crank chamber from which it can be drained. The big ends of the connecting rods are lubricated by scoops which dip into the oil in the bottom of the crank chamber, the oil being forced to the crank pin as the crank shaft revolves.

GENERATOR.

The generator is a General Electric, 90-kw, 8-pole, separately excited unit, which has been specially designed with a view to procuring the lightest possible machine for the necessary output, and at the same time keeping the temperature rise to within a reasonable figure. It is provided with commutating poles, which, in conjunction with the potential type of control, gives a great flexibility of current output.

The advantage of this arrangement will be readily appreciated when it is pointed out that at starting the field excitation is weak, and that large currents are required to give the necessary starting torque. The normal pressure when running at 550 r. p. m. is 250 volts, at which time the current will amount to 360 amps., but at starting a

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current of 800 amps. can be secured at a corresponding decrease in voltage. It would be impossible to commutate so large a current in a machine with so great a kilowatt capacity per pound without the use of commutating poles.

The total weight of the generator, including exciter, is only 2740 lbs., while a standard machine of this output weighs 8800 lbs. As is only natural in a machine where the weight has been so materially reduced, the temperature rise is higher and the efficiency lower than in standard apparatus of the same output. The higher temperatures are fully provided for by the type of insulation employed; there is no paper or muslin used anywhere in the machine. The armature coils are insulated with mica, the interpole coils with asbestos and the field coils are wound with enamelled wire. The armature leads to the commutator are riveted as well as soldered, although the precaution has been taken to use pure tin for soldering, which has a melting point of over 200 degs. C. Air ducts of ample dimensions are provided to insure a large volume of air being circulated through the core. The efficiency is 88 per cent, being only about 3 per cent lower than a standard machine having a temperature rise of 35 degs. C.

CAR ON TRIAL TRIP

The exciter is a 3-kw, 70-volt, shunt-wound machine, with its armature mounted directly on the armature shaft of the main generator and its field yoke supported by the bearing brackets, enabling it to fit under the back ends of the generator armature windings. The illustration of the engine, generator and exciter assembled shows far better than a written description the neatness and compactness of this generating set.

CONTROL SYSTEM.

The speed of the motors is governed by a potential control, the generator being separately excited and the terminal voltage of the motors being varied by means of a rheostat in series with the exciting circuit. The simplest explanation of the controlling system is arrived at by considering the circuits separately. The armature circuit of the main generator comprises the armature—fuse—two contactors in series, reverser, and the two motors. The motors are connected in series or in parallel, according to the position of the controller handle, and they are gounded to the truck framework, while the solenoid coils for operating the contactors are energized by a storage battery floating across the field circut. The reverser is operated as usual by a separate reverser handle on the controller.

The current from the exciter passes around the field of the main generator and through the rheostat; the function of the controller is to cut in and out this rheostat as occasion demands.

A storage battery which floats on the exciter circuit is used for supplying the lighting circuits and its charging and discharging is controlled by means of a reverse current relay which permits the lights being supplied directly from the exciting circuit or from the storage battery according to the voltage of the exciter circuit. A Tirrill regulator is employed for regulating the voltage on the lighting circuit. These arrangements enable the car lights being used when the engine is at rest.

The master controller, which has some unique features, is of type C-44, and gives seven steps with the two motors connected in series and eight steps with the two motors connected in parallel. It is provided with four handles, three of which are mounted one above the other on concentric shafts. The function of the top handle is to advance and retard the ignition of the engine, the second controls the throttle of the engine, while the third handle controls the generator field resistances and the contactors, which establish the circuit for the motors, besides transposing the motor connections from series to parallel. The fourth handle operates the reversing switch and controls the direction of rotation of the motors.

The car is heated by passing part of the exhaust gases through pipes suitably located in the car body.

BRAKES AND TRUCKS.

The car is provided with a straight air brake equipment and the air is supplied by means of a compressor which is direct connected to the engine. The working pressure is 60 lbs. per sq. in. and this is kept constant in the storage tank by a mechanical governor. Hand brakes are also provided.

The trucks were constructed by the American Locomotive Company. They are of the swing bolster type, and have wheels 36 ins. in diameter: One motor is mounted on each truck. The journals are of the MCB standard pattern.

The interior of these cars can be designed to suit any requirements or service. Cars of this type are available for use as private cars, with sleeping and dining accommodation, as inspection cars, wrecking cars, and baggage cars, etc., etc.

TRIAL TRIP.

On its trial trip the car received its passengers in the nearly completed new Union Station at Schenectady. The route selected made a circuit of about seventy-eight miles in length, including Albany, Cohoes and Mechanicsville. It contained its full capacity of passengers. A total of twenty-three stops were made in addition to many unrecorded slowdowns due to signals and other yard restrictions, the average length of a stop being slightly less than one minute. The engine, however, ran continuously during the trip.

The speed of the car varied from 23 m. p. h. on a 1.3 per cent up grade to 56 m. p. h. on a ¼ per cent down grade, except where traffic conditions and road regulations required lower speeds. Where traffic conditions permitted, a speed of 50 m. p. h. was recorded on level track and from Albany to Mechanicsville a speed of 47 m. p. h. was sustained on a steadily rising grade. The eight-cylinder gas engine developed at times 150 hp. and the 60-hp motors were under such perfect control of the operator that the aceleration was noticeably smooth and free from jerks.

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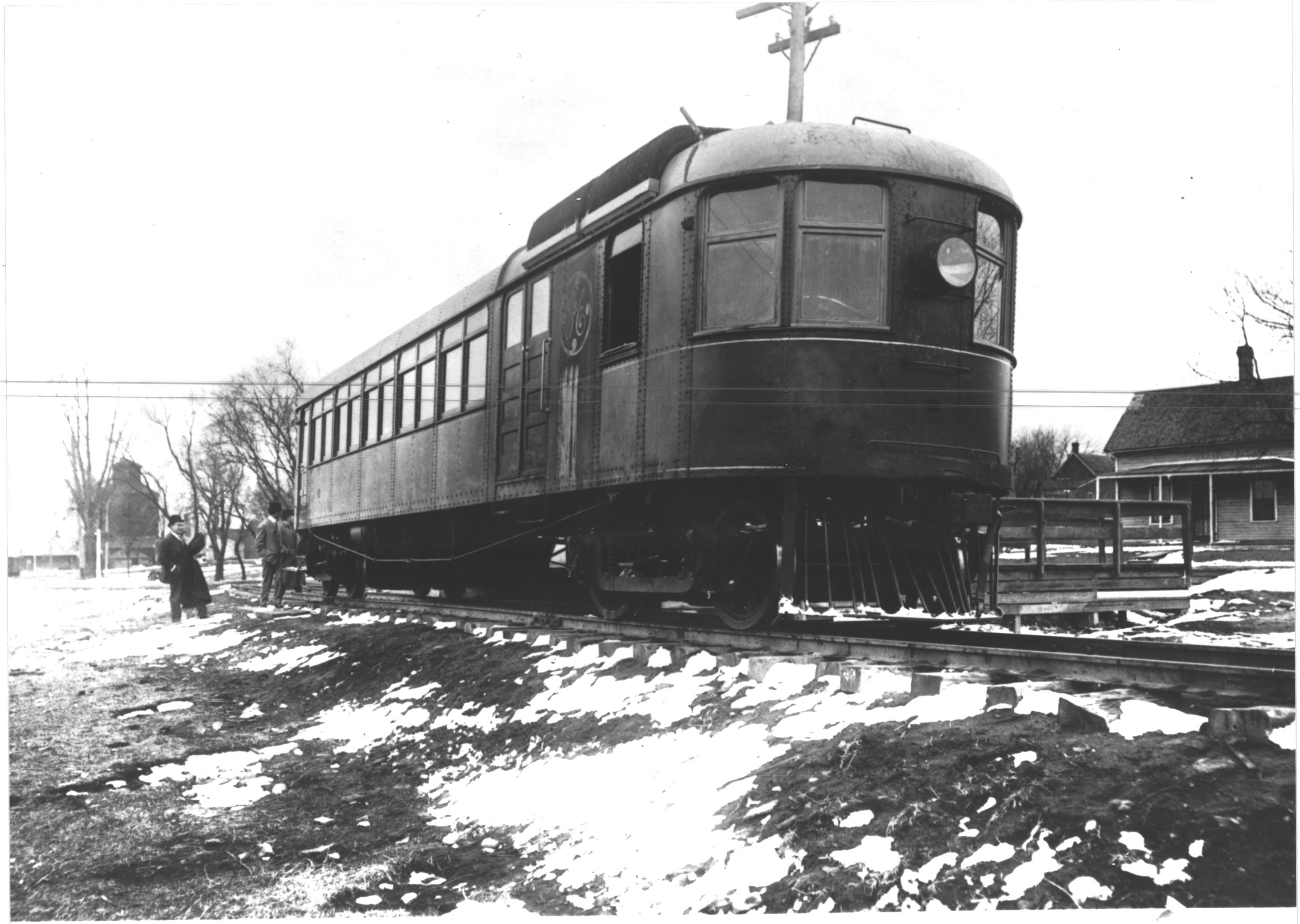

218653 GENERAL ELECTRIC COMPANY'S GAS ELECTRIC MOTOR CAR NO. 2. MINNEAPOLIS, ST. PAUL, ROCHESTER AND DUBUQUE ELECTRIC TRACTION COMPANY

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ELECTRIC TRACTION WEEKLY

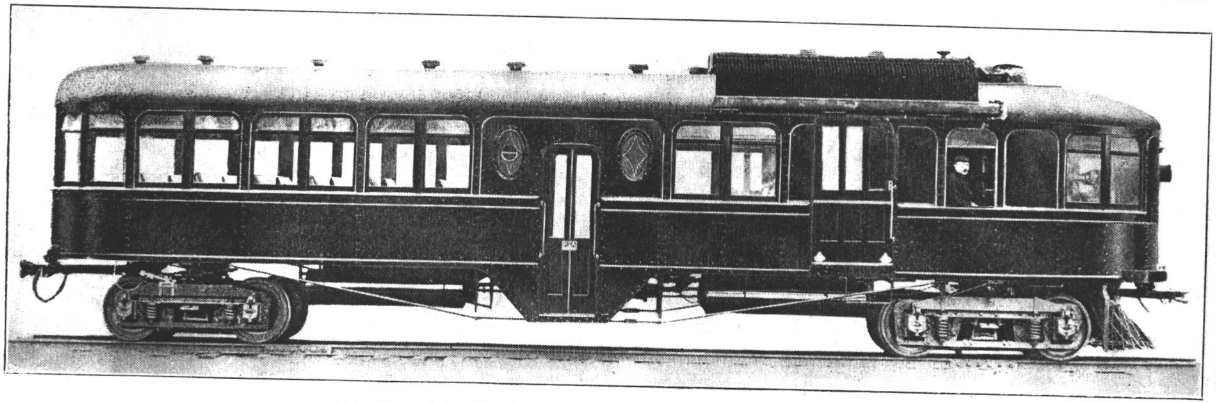
VOL. VII CHICAGO, ILL., APRIL 8, 1911 NO. 14

The "Dan Patch" Gas-Electric Line

New General Electric System Shows Good Service on New Minnesota Interurban—Financed by Popular Subscription

EDITORIAL CORRESPONDENCE

The Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company's line, better known as the Dan Patch Line, is now in operation between Minneapolis and Northfield, Minn., a distance of 37½ miles, and it will probably be extended to Owatonna, 50 miles from Minneapolis, this year and possibly to Rochester, 60 miles. Particular interest attaches to this line by reason of the facts that it is being financed by popular subscription by means of advertising in all parts of the country, and because it is now being operated with gas-electric cars. Ultimately the promoters hope to extend the line to Dubuque, Iowa, 109 miles south of Minneapolis, and in time it will be equipped with overhead trolley with probably the single-phase system of propulsion.



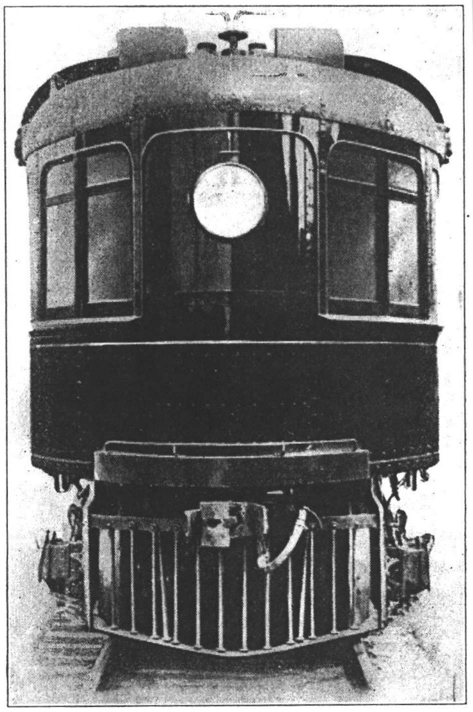
Exterior of G. E. Gas-Electric Car of "Dan Patch" Line

The line was promoted originally by William Mason, of Minneapolis, and was taken up and financed by M. W. Savage, a wealthy Minneapolis manufacturer, proprietor of the International Stock Food Company and owner of the famous race horse Dan Patch, after which the road was nicknamed. Mr. Savage's company occupies an immense building in the downtown section of Minneapolis, built originally as an exposition building, and it is the intention to use the first floor of the building for a terminal station for the new road. At present the line operates only to the outskirts of Minneapolis, where connection is made with the city cars of the Twin City Rapid Transit Company. A small but well arranged terminal station has been completed and the Dan Patch cars load and unload at a platform on one side of the building, while the city company has a Y extending to the platform on the other side.

The first section of the road from Minneapolis to Lakeville involved considerable heavy construction work owing to the rough character of the country. On this section there are a number of heavy cuts and fills, all of which were graded for double track by the use of steam shovels. The maximum grade is about 2 per cent and all curves are spiraled and elevated for high speed. Crossing the Minnesota river, a short distance south of Minneapolis, the company erected a double-track, two-span bridge which cost about $50,000. As this is a navigable stream it was necessary to make this a swing bridge; however it is turned only a few times in the course of a year and the company has arranged with a farmer who lives a short distance from the bridge for swinging it when necessary.

The track is laid with 75-lb. rail with a good class of ties, and, on the whole, the construction compares favorably with best interurban construction. A telephone line is being constructed for dispatching but there is, of course, no overhead construction.

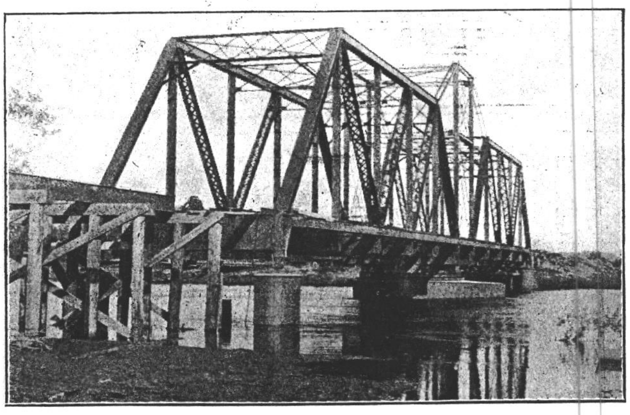
Near Minneapolis the line passes several beautiful lakes and since the road commenced operation a number of summer villages have been located on these lakes. The railway company has several hundred acres which it is cutting up into allotments for permanent residences. Northfield, the present southern terminus, has about 2,000 population, while Rochester has about 5,000 population. The territory traversed by the new line is rich farming country and it is developing rapidly with an influx of home seekers desiring to settle near the Twin Cities.



Front of G. E. Gas-Electric Car of "Dan Patch" Line

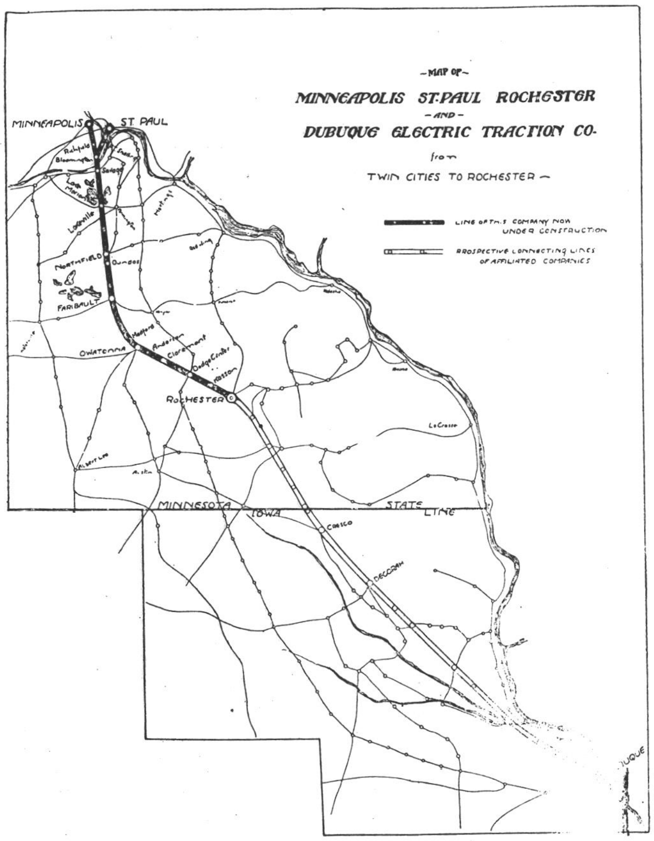
Due to the desire to commence operation with partial service immediately following track laying, and to the uncertainty as to the ultimate extension of the line, it was deemed advisable to commence operation with self-propelled cars.

The initial equipment consisted of three gasoline-electric cars built by the Strang Gas Electric Car Company, of New York city. One of these was a 32-ft. single truck car and the other two were 62-ft. cars built by this company for exhibition purposes. One of these cars, the Irene, made an extended trip through the Eastern and Middle Western states two years ago and for a time it was operated on the Strang line between Kansas City and Olathe, Kan. The second car of this type was accidently destroyed by fire a few weeks ago. Since then the service has been filled by an experimental car built by the General Electric Company.



Double Track, Steel Draw Bridge of "Dan Patch" Line Across Minnesota River

The Irene, now used in regular service, is one of the most palatial cars ever built. The car measures 62 ft. 6 ins. over all and 9 ft. 6 ins. wide. The frame and exterior sheathing are composed of structural steel. Vermillion wood, richly carved and inlaid, constitutes the interior finish of the car with the exceptions of the ceilings which are composed of sheet metal. The car has three compartments, the rear section being provided with chair seats, desk and sideboard. The main passenger section is in the center and has cross seats with toilet room and lavatory at one corner. The engine is of the vertical four-cycle type, having six cylinders, 10½ x 9 ins., giving 150 h. p. at 425 r. p. m. Direct connected to the engine is an 85-kw. 250-volt, shunt-wound, interpole generator. The motors are two G. E. 100-h. p., 250-volt, series-wound, interpole, both motors mounted on the forward truck. A battery consisting of 112 cells with a capacity of 300 amp. hrs., is used for starting and for lighting.

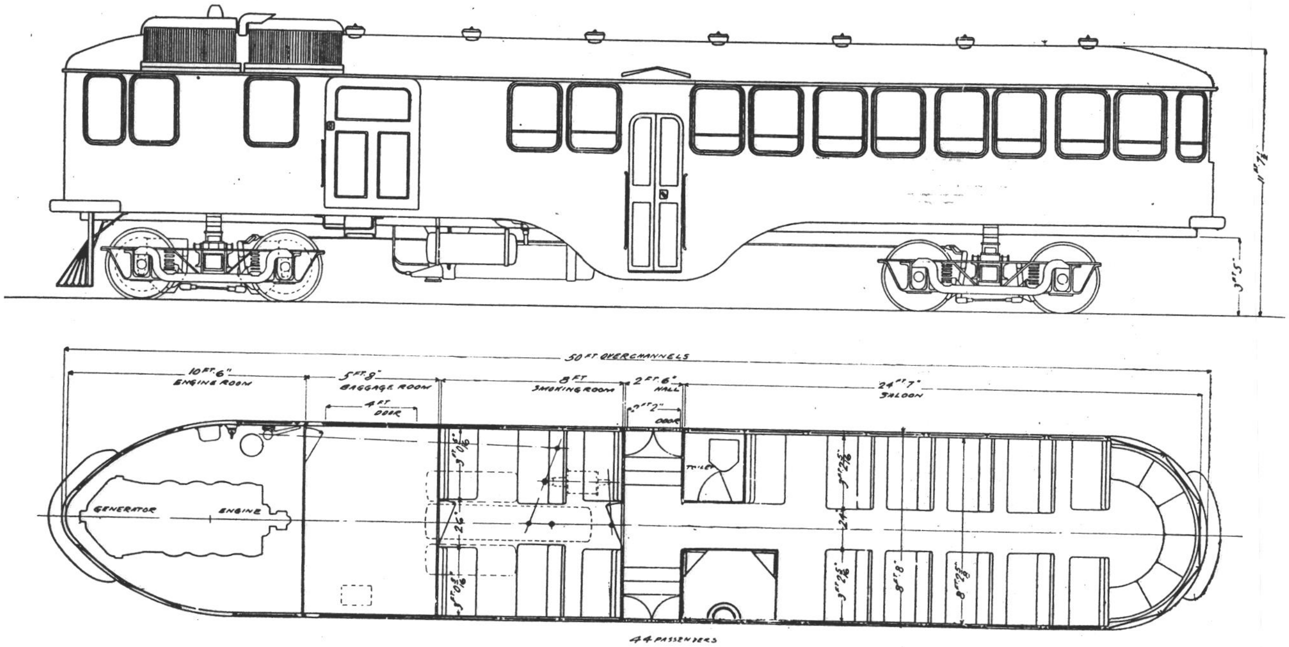

—MAP OF—
MINNEAPOLIS ST. PAUL ROCHESTER
—AND—
DUBUQUE ELECTRIC TRACTION CO.
from
TWIN CITIES TO ROCHESTER—
LINE OF THIS COMPANY NOW UNDER CONSTRUCTION
PROSPECTIVE CONNECTING LINES OF AFFILIATED COMPANIES
MINNEAPOLIS
ST PAUL
Richfield
Bloomington
Savage
Lake Marion
Lakeville
Hastings
Northfield
Dundas
Faribault
Medford
Owatonna
Anderson
Claremont
Dodge Center
Kasson
Rochester
La Crosse
Albert Lea
Austin
MINNESOTA
IOWA
STATE LINE
Cresco
Decorah

Map of the "Dan Patch" Line

The gas-electric car supplied by the General Electric Company and now in service on this line was fully described in Electric Traction Weekly of January 23, 1908. It has a steel body, 52 ft. over all, and it is equipped with an eight-cylinder, V-type, vertical engine of 125 h. p., driving a 75 kw. 250-volt generator which supplies two 75-h. p. motors mounted on the forward trucks.

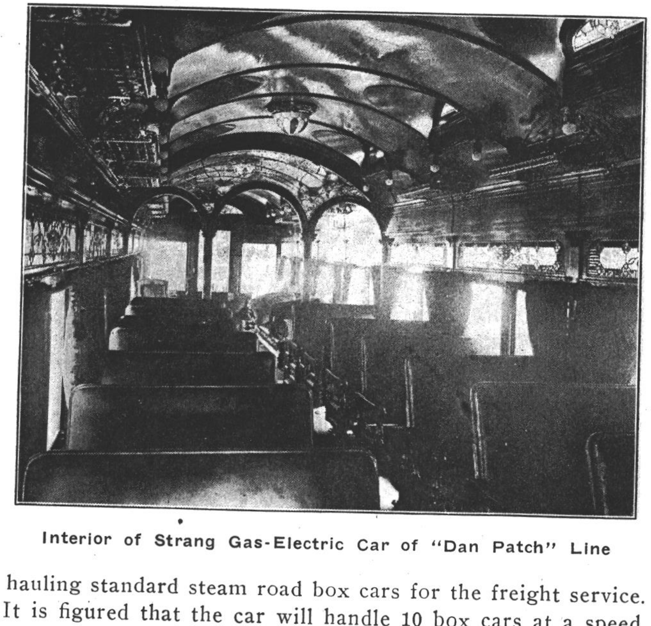
Two additional cars have been ordered from the General Electric Company and these will be ready for delivery next month. These cars measure 60 ft. over all and are of the side entrance type. There are four main compartments; engine room, baggage, smoker and passenger compartment, the latter having round observation rear end. The main compartment has a ladies' dressing room with lavatory, mirror, drop seats and toilet facilities, this being in addition to the usual toilet room.

The motive power of this car consists of an eight-cylinder V-shaped gas engine of 250 h. p. driving a 150-kw. generator which supplies current to two 100-h. p. motors mounted on the forward trucks. The weight of this car complete is 39 tons and it has a guaranteed speed of 45 m. p. h. on all grades on this line. An interesting feature of this equipment is that it will be equipped with trolley, making it possible to use it as an ordinary electric car, thus obviating the necessity of running the engine while on city tracks.



Side Elevation and Floor Plan of G. E. Gas-Electric Car of "Dan Patch" Line

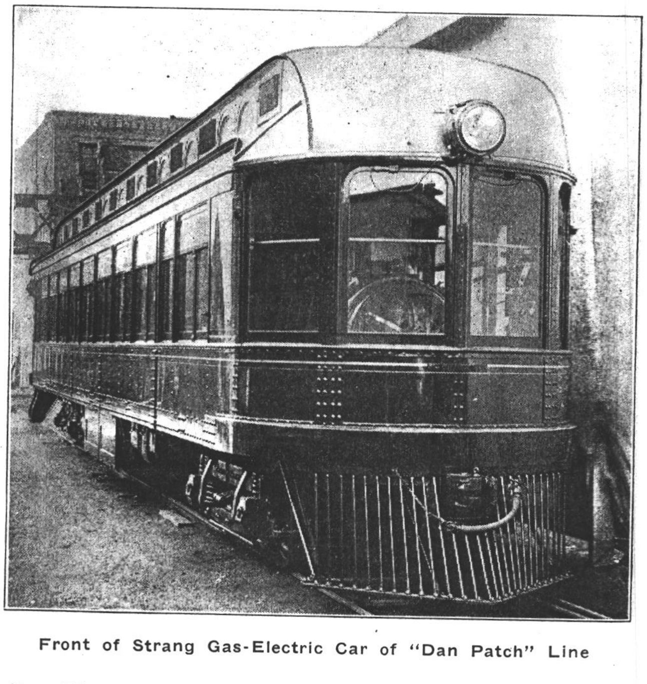
Arrangements are also being made for the purchase of an express car to be equipped with a 200-h. p. eight-cylinder engine with 125-kw. generator supplying four 125-h. p. motors. This car will be geared low and will be used for hauling standard steam road box cars for the freight service. It is figured that the car will handle 10 box cars at a speed of 18 m. p. h.



Interior of Strang Gas-Electric Car of "Dan Patch" Line

The operation of gasoline-electric system has been fairly satisfactory on this road. It is stated that the car Irene was in constant service for six months, averaging 175 miles per day without missing a trip. The principal troubles were battery and magneto troubles which were remedied during the daily inspection.

The G. E. car which has been handling the service during the past three months, has been making two round trips daily, or about 150 miles. The daily consumption of gasoline has been 80 to 85 gallons at 9¾ cents per gallon, with lubricating oil consumption of six gallons at 23½ cents per gallon. The cost of power is thus about 6.2 cents per car mile. The engineer who is paid 30 cents an hour attends to the inspection and maintenance of the car between trips.



Front of Strang Gas-Electric Car of "Dan Patch" Line

With two round trips per day, aggregating 150 miles, it is stated that the car is earning an average of $75 per day. The service will be increased to two-hour headway as soon as additional equipment is received.

The operation of this property is in the hands of F. A.

Martin, formerly with the Brooklyn Rapid Transit Company and later with the electric division of the New York Central.

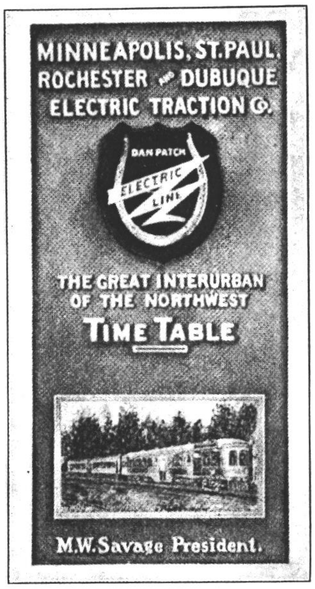
◆

MEETING OF COMMITTEE ON PASSENGER TRAFFIC

A meeting of the Committee on Passenger Traffic of the American Electric Railway Transportation & Traffic Association was held in New York on March 31, 1911, with the following members present: L. D. Pellissier, chairman; Frank Caum and F. G. Buffe. A telegram from T. A. Cross stated that it would be impossible for him to attend.

The work taken up by the committee was the question of every-day business, and to get a better idea of what different companies were doing in this respect it was decided to get up a data sheet to be sent out to member companies. This data sheet will cover among others the following subjects:

Boards of trade, or other civic organizations. The membership, dues, activities and general results; the relationship of the railway company to these organizations and the results obtained from the company's standpoint, both in relation to new industries drawn to the city and from conventions and meetings.


MINNEAPOLIS, ST. PAUL, ROCHESTER & DUBUQUE ELECTRIC TRACTION Co.
DAN PATCH
ELECTRIC LINE
THE GREAT INTERURBAN OF THE NORTHWEST
TIME TABLE
M. W. Savage President.

Front Cover of "Dan Patch" Folder
(Actual Size)

Publicity. Employment of industrial agents, land agents, or other officials whose primary duties are to secure manufactories along the line of route, also the employment of passenger agents with similar duties.

Advertising. Circulars and their distribution, cost per thousand, special advertising and permanent advertising, and the territory covered; newspaper advertising, its extent, cost and benefits, and method of payment, either cash or exchange basis; the preparation of literature by outside parties who solicit other advertising than that of the company and the results obtained.

Methods of fostering better public sentiment. Co-operation with merchants who either pay the fares of their customers or furnish transportation between their stores and the railway.

Effect of commutation on the permanent increase in business. Reasons for putting commutation rates in force, rates of fare, profits resulting and limits between which commutation rates may be given.

Other methods of creating every-day business, such as company periodicals, summer and winter resorts, special attractions, etc.

Chartered cars. This subject has already been covered by a data sheet and the results will be included in the report, together with the above information.

◆

NEW RAILS FOR NEW YORK SUBWAY

The Interborough Company has just placed an order for 5,000 tons of steel rails to cover the annual repairs. According to the company's publication, the Interborough Bulletin, this steel differs somewhat from the steel formerly ordered, in having a higher carbon constituent, the specifications requiring that the carbon shall average not less than 0.85 per cent, rails to be made by open hearth process.

The original rails in the subway were made by the Bessemer process, and the steel content averaged about 0.50 per cent. As these rails wore on curves, they were replaced with Bessemer rails with a carbon constituent of 0.65 per cent, which was as high as it was thought advisable to go in Bessemer steel on account of the phosphorus, which it was difficult to reduce below 0.1 per cent.

Open hearth rails were then tried, and it was found that with a carbon constituent of 0.80 per cent, the rails lasted about twice as long as the original Bessemer rails.

The original rails in the subway seem to have a life of about six years on straight track and from three months to a year on the curves, depending upon the degree of curvature, and therefore most of the original rails have been replaced.

Experiments have been made with rolled manganese steel rails on curves, and as a result, it has been decided to renew the rails on important curves in the subway with manganese steel rails.

Managanese steel rails seem to have about five times the length of service of the original Bessemer rails. The manganese steel has a carbon content of over 1 per cent and a manganese content of from 11 to 14 per cent, the ordinary open hearth having less than 1 per cent of manganese.

◆

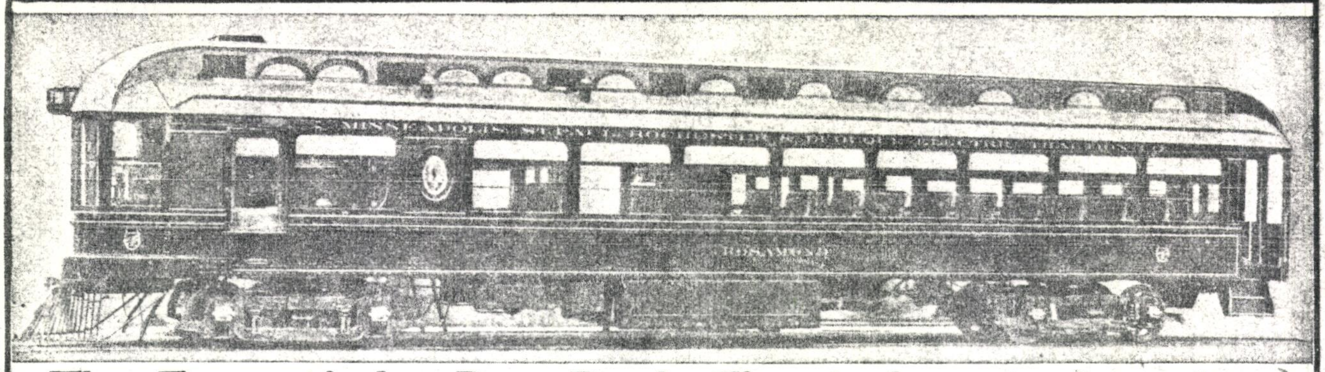
SOAP CONCRETE

Soap-water instead of ordinary water, has successfully been used for the purpose of making reinforced concrete water-tight. The case is reported in Beton und Eisen, of January 3, and concerns a grain-elevator built on the Danube, exposed to inundation. The concrete was provided with two coatings, also of concrete. The outer coating, 3½ ins. in thickness, consists of fine-grained concrete containing 400 kg. of cement and 120 litres of water per cubic meter of mass, and the inner layer, ½ in. in thickness, consists of cement mortar prepared with fine river sand. The water is replaced by a solution of common soft soft soap (potash soap), about 4 kg. of soap being added to 1 cu. in. of concrete. The building has stood one inundation well, while another building of the same material, without the soap, did not quite keep the water out. Subsequent tests were also favorable. The soap concrete is very cheap compared with other means used to render the concrete impermeable to water. The action of the soap seems to be that the lime of the cement is bound by the fatty acids of the soap.—Engineering.

◆

FOUR TIMES HURT—BUT HOW? WANTS DAMAGES

In defense against a recent damage suit the Washington Water Power Company, of Spokane, Wash., is reported to have brought out the fact that in addition to the accident for which damages were claimed, the complainant had been in another accident, also in a serious runaway, had been attacked by a stallion and had been in combat with a maddened bull. Photographs were introduced showing the complainant at work shortly after the accident in which he claimed to have received his injuries.



The Fame of the Dan Patch Electric Line is Spreading Among the Technical and Popular Magazines. Our Road is Receiving Favorable Notice Everywhere. Read the Editorial Taken from the January Number of Popular Electricity Magazine.

Electric Railway Without A Trolley

"There operates out of Minneapolis, Minn., one of the most novel and interesting railroad systems in the world.

This system is owned by the Minneapolis, St. Paul, Rochester and Dubuque Electric Traction Company. At present, the road operates between the southern limits of the city of Minneapolis and Northfield, Minn., a distance of 38 miles, but by next summer it expects to operate 40 miles additional.

The novelty of its construction and operation lies mainly in the fact that it is operated by gas-electric motor cars for power. No trolley wire or third rail is used. Power is developed first by a gas engine on each motor car. This power is used to drive a dynamo, which in turn furnishes electric current to operate the car motors. Each motor car therefore, carries its own independent power plant and electric system.

During the coldest months of the winter of 1911 and 1912, when all steam and electric cars in the state of Minnesota were forced to operate far behind regular train schedule time, this line ran smoothly and promptly, a train schedule never being missed. This remarkable record was due in the main to the fact that during the heavy snow storms and extremely cold weather, no roaring fires had to be kept up, as in steam locomotive operation. There were no steam pipes to freeze up or burst, no water tanks to freeze, no trouble at coaling stations, no heavy counterbalances on the wheels to break rails in cold weather and cause delay and accidents, no fires to be cleaned or flues to blow out. Neither were there any overhead trolley wires to sleet over and break nor power house to break down.

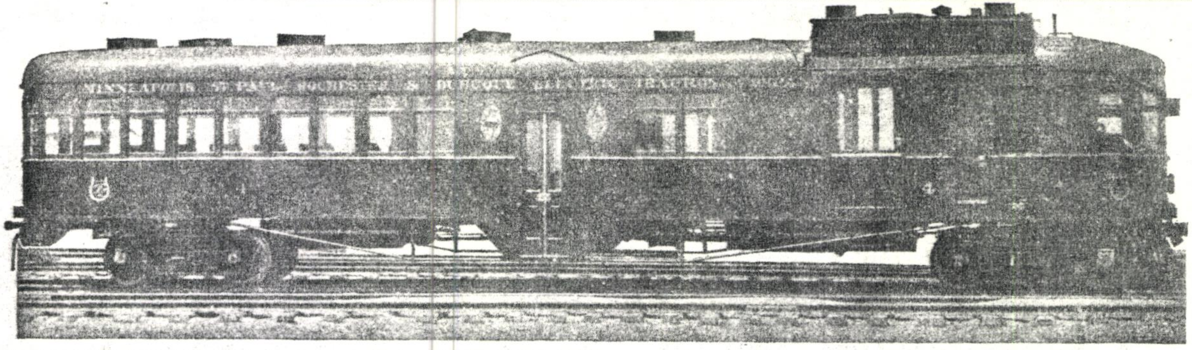
The method of control and power application is essentially the same as that of an ordinary electric car but has an additional advantage in that the dynamo voltage is varied by the controller to produce speed changes of the motors, thus providing a smooth and rapid acceleration without loss of power. The engine is entirely enclosed, eliminating all wear from dust and dirt. On down grades it is possible to lower the speed of the engine and still maintain the desired car speed, thus reducing the wear on the engine bearings. The radiators, located as they are on the roof, are protected from damage by flying stones, etc. The entire power plant in the gas-electric motor car is within easy reach of the operator."

LOW OPERATING COST DAN PATCH ELECTRIC LINE CARS.

The Dan Patch Electric Line is fast forging to the front among the Electric Interurbans of the country. Its equipment, though somewhat unique, is the most modern and up-to-date that can be obtained—Serviceable, safe and cheap to operate as shown by the statement on the reverse of this page. We operate our cars at a cost of a fraction over twelve cents per mile while the trolley and third rail car costs about eighteen cents per mile. We now have $300,000 worth of high class equipment and have just placed an order for $153,000 more. This includes a High Power Gas Electric Locomotive, three 70-foot all steel power cars and several trailers.

Editorial on Page 934 and 935 Jan. 1913 issue of Popular Electricity

Form D. P. 85



AUGUST, 1911

Total mileage including 2482 miles with trailer 16,245

	Monthly expense	Cost per train mile
WAGES:		
Motormen and conductors..	$841.10	
Extra conductors for Sunday	33.05	
	$874.15	$.0538
FUEL:		
9887 gals. gasolene at 6¼ cts. per gallon...........	617.94	.0380
OTHER EXPENSES:		
Engine oils 294 gals. at 26 cts. per gallon...........	76.44	.0047
Journal oils 90 gals. at 7 cts. per gallon...........	6.30	.0004
Cleaning cars, 2 cleaners..	81.30	.0050
Waste, soap, etc............	6.70	.0004
Superintendence, inspection and maintenance, 3 men.	326.00	.0201
	$1988.83	$.1224

SEPTEMBER, 1911

Total mileage including 3028 miles with trailer 15,966

	Monthly expense	Cost per train mile
WAGES:		
Motormen, conductors and flagmen	$786.32	
Extra crews	187.93	
	$974.25	$.0610
FUEL:		
9920 gals. gasolene at 6 cts. per gallon	595.20	.0372
OTHER EXPENSES:		
Engine oils 327 gals. at 24 cts. per gallon...........	78.48	.0049
Journal oils 85 gals. at 7 cts. per gallon	5.95	.0004
Waste, lamp renewals and other supplies including expense of car heating..	65.24	.0041
Maintenance of electrical equipment	43.65	.0027
Maintenance cars	3.50	.0002
Total shop expenses, car cleaning, etc.	173.21	.0109
	$1939.48	$.1214

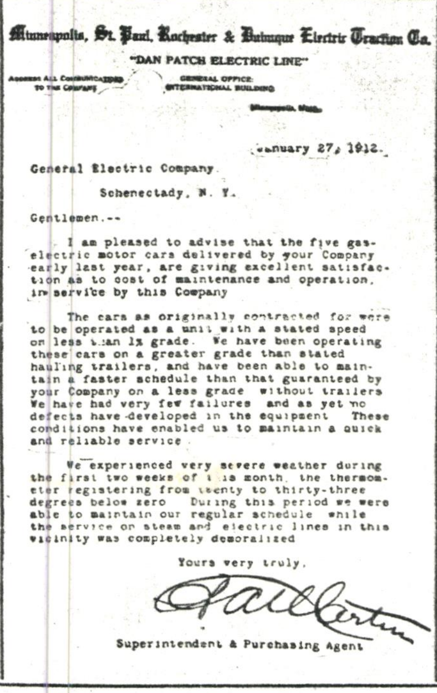
OCTOBER, 1911

Total mileage 14,556

	Monthly expense	Cost per train mile
WAGES:		
Motormen, conductors and flagmen	$713.65	$.0490
FUEL:		
9024 gals. gasolene at 6.32 cts. per gallon...........	570.33	.0390
OTHER EXPENSES:		
Engine oils 376 gals. at 23.4 cts. per gallon.....	87.98	.0060
Journal oils 58 gals. at 7.7 cts. per gallon	4.47	.0003
Waste, lamp renewals and other supplies including expense of car heating..	92.45	.0064
Maintenance of electrical equipment	67.36	.0046
Maintenance of cars.......	52.97	.0037
Total shop expense, heating and lighting shops, etc.	201.82	.0140
	$1791.03	$.1230

This page contains complete operating costs of five G-E Gas Electric Motor Cars for six months on the lines of the Minneapolis, St. Paul, Rochester and Dubuque Electric Traction Co.

This Company has recently placed its 5th repeat order for three more power cars and one High Power Gas Electric Locomotive capable of hauling 40 loaded Freight cars. This Locomotive is the first of its type ever built.



Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Co.

"DAN PATCH ELECTRIC LINE"

Address All Communications to the Company

General Office: International Building

Minneapolis, Minn.

January 27, 1912.

General Electric Company.

Schenectady, N. Y.

Gentlemen.--

I am pleased to advise that the five gas-electric motor cars delivered by your Company early last year, are giving excellent satisfaction as to cost of maintenance and operation, in service by this Company

The cars as originally contracted for were to be operated as a unit with a stated speed on less than 1% grade. We have been operating these cars on a greater grade than stated hauling trailers, and have been able to maintain a faster schedule than that guaranteed by your Company on a less grade without trailers We have had very few failures and as yet no defects have developed in the equipment These conditions have enabled us to maintain a quick and reliable service

We experienced very severe weather during the first two weeks of this month the thermometer registering from twenty to thirty-three degrees below zero During this period we were able to maintain our regular schedule while the service on steam and electric lines in this vicinity was completely demoralized

Yours very truly,

Superintendent & Purchasing Agent

NOVEMBER, 1911

Total mileage 15,103

	Monthly expense	Cost per train mile
WAGES:		
Motormen, conductors and flagmen	$608.38	$.0403
FUEL:		
9076 gals. gasolene at 6.32 cts.	573.60	.0380
OTHER EXPENSES:		
Engine oils 515 gals. at 23.4 cts. per gallon......	120.51	.0080
Journal oils 54 gals. at 7 cts. per gallon...........	3.78	.0002
Waste, lamp renewals and other expenses, including car heating	90.64	.0060
Maintenance of electrical equipment	87.30	.0058
Maintenance of cars.......	41.26	.0027
Total shop expense, car cleaning, heating shops, etc.	290.94	.0193
	$1816.41	$.1203

DECEMBER, 1911

Total mileage 15,487

	Monthly expense	Cost per train mile
WAGES:		
Motormen, conductors and flagmen	$610.19	$.0394
FUEL:		
9359 gals. gasolene at 6.32 cts. per gallon...........	591.49	.0382
OTHER EXPENSES:		
Engine oils 396 gals. at 23.4 cts. per gallon......	92.66	.0059
Journal oils 56 gals. at 7.7 cts. per gallon..........	4.31	.0003
Waste, renewals and other expenses, including car heating	144.10	.0093
Maintenance of electrical equipment	102.60	.0066
Maintenance of cars.......	69.59	.0045
Total shop expense, car cleaning, heating shops, etc.	309.26	.0200
	$1924.20	$.1242

JANUARY 1912

Total mileage 13,716

	Monthly expense	Cost per train mile
WAGES:		
Motormen, conductors and flagmen	$530.97	$.0388
FUEL:		
8920 gals. gasolene at 6.32 cts. per gallon	563.75	.0411
OTHER EXPENSES:		
Engine oils 257 gals. at 23.4 cents per gallon....	60.14	.0044
Journal oil 52 gals. at 7.7 cts. per gallon....	4.00	.0003
Waste, lamp renewals and other expenses, including car heating	131.93	.0096
Maintenance of electrical equipment	77.01	.0056
Maintenance of cars......	60.72	.0045
Total shop expense, car cleaning, heating shops, etc.	313.02	.0228
	$1741.54	$.1271

General Electric Company

Largest Electrical Manufacturer in the World

Principal Office: Schenectady, N. Y.

Sales Offices in all large cities

Ad. Reprint No. 128

3431

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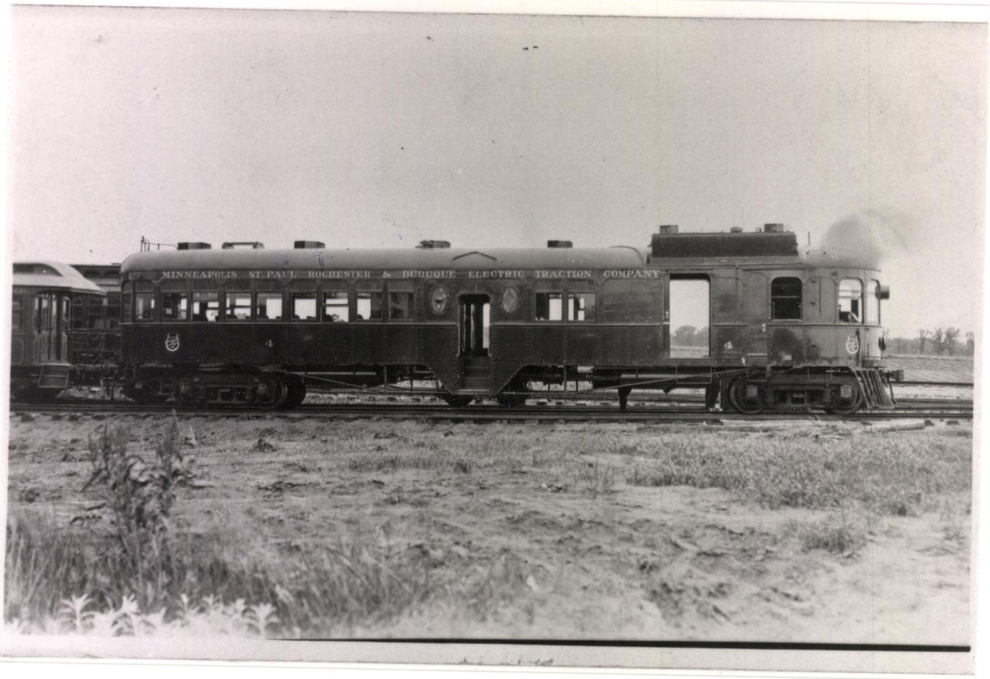
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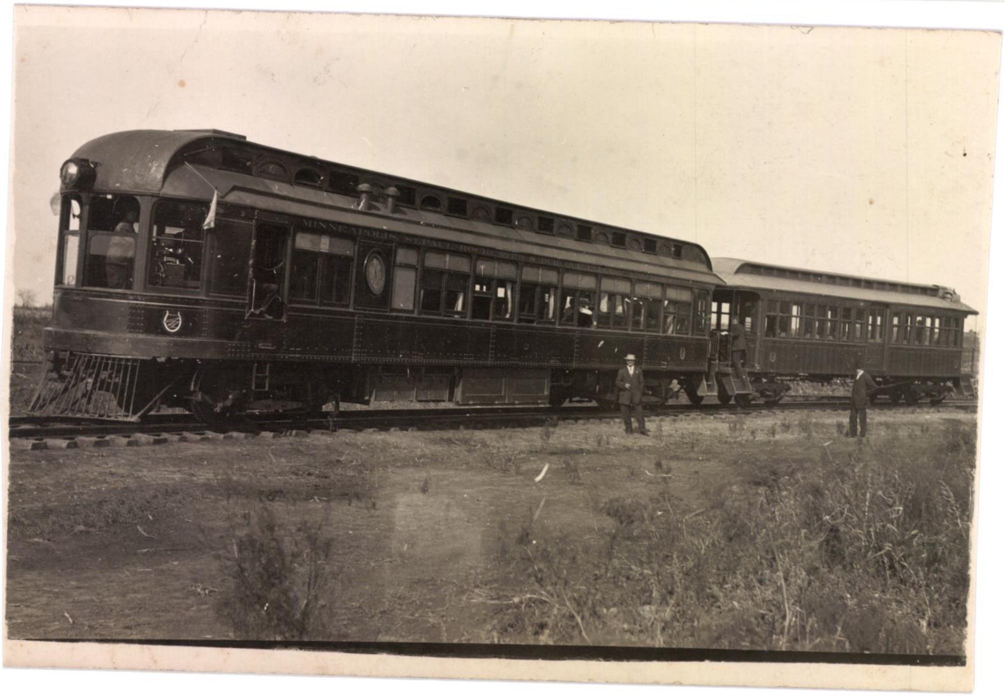

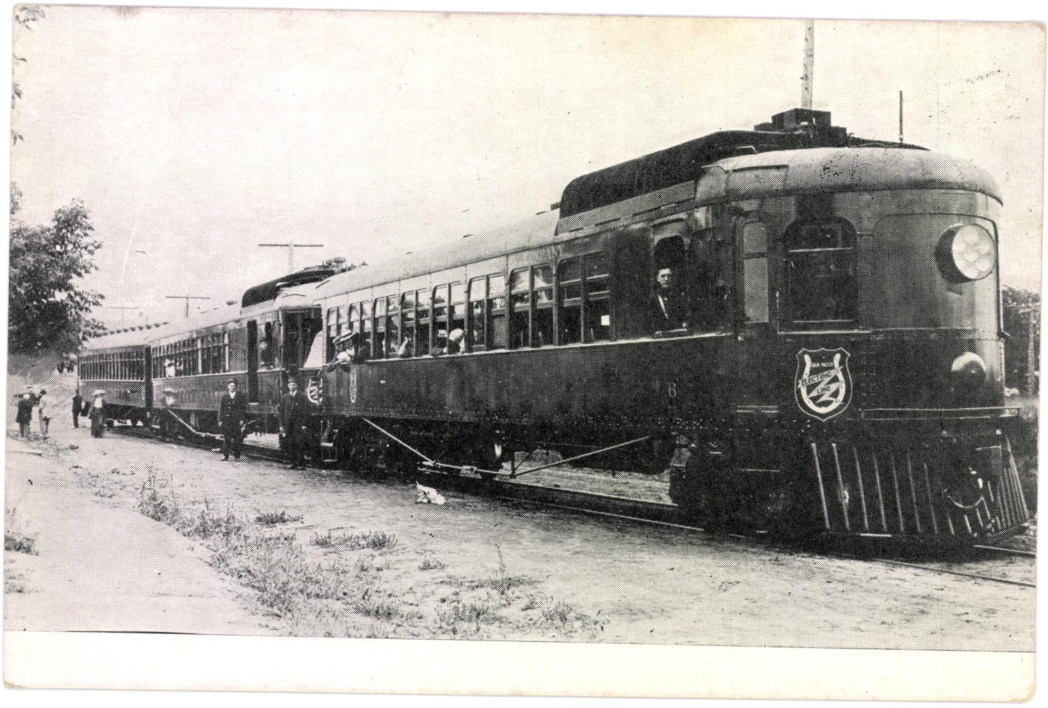

TABLE III—GENERAL ELECTRIC GAS-ELECTRIC PASSENGER CARS IN SERVICE

Railway	No.	Type	Seats	Wght. Tons	Shipped	Where Used	Miles Route	Max. Grade	Daily Reven. Mileage	Sched. Speed, M.P.H.	No. of Interm. Stops
Southern	1	CRE-55	52	41	2–11	Greenville-Anderson, S. C.	37	1	170	18½	34
Southern[1]	1	CRE-55	52	41	4–11	Memphis-Collierville, Tenn.	25	1	100	21½	18
Buffalo, Rochester & Pittsburgh[2]	1	CE-66-B-6	90	46	4–11	Buffalo-Springville, N. Y.	32	..	128	22½	..
Minneapolis, St. Paul, Rochester & Dubuque Traction	1	RE-50-B-5	44	32	12–10	Minneapolis-Northfield	37.34		See Table IV		
Minneapolis, St. Paul, Rochester & Dubuque Traction	2	CE-58-B-8	47	41	5–11	Minneapolis-Northfield	..	..	..	..	..
Minneapolis, St. Paul, Rochester & Dubuque Traction	1	RE-57	88	39	6–11	Minneapolis-Northfield	..	..	..	..	..
Minneapolis, St. Paul, Rochester & Dubuque Traction	1	RE-57-B-6	75	40	7–11	Minneapolis-Northfield	..	..	..	..	..
Minneapolis, St. Paul, Rochester & Dubuque Traction	1	RE-67-B-11	88	46	3–12	Minneapolis-Northfield	..	..	..	..	..
Minneapolis, St. Paul, Rochester & Dubuque Traction	2	RE-70-B-11	91	49	5–12	Minneapolis-Northfield	..	..	..	..	..
Minn., St. P., Roch. & Dub. Tr.	1	"Marion"	....	49	5–13	Minneapolis-Northfield	..	..	..	..	..
Minn., St. P., Roch. & Dub. Tr.	2	RE-70-B-11	91	49	8–13	Minneapolis-Northfield	..	..	..	..	..

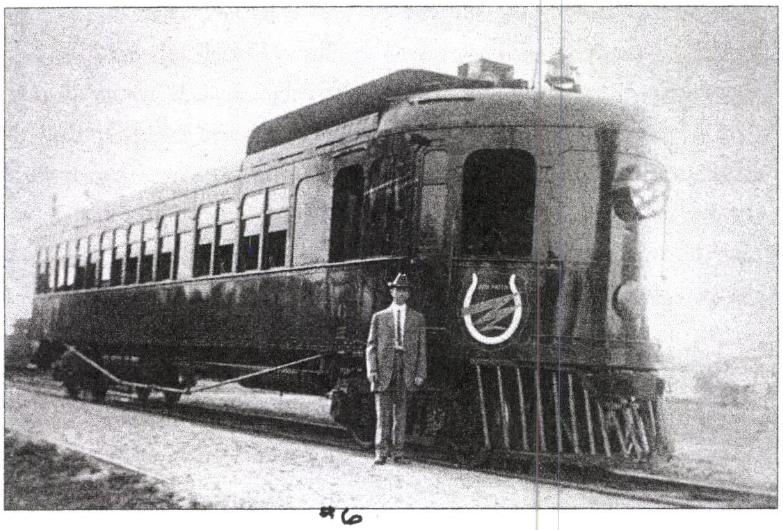

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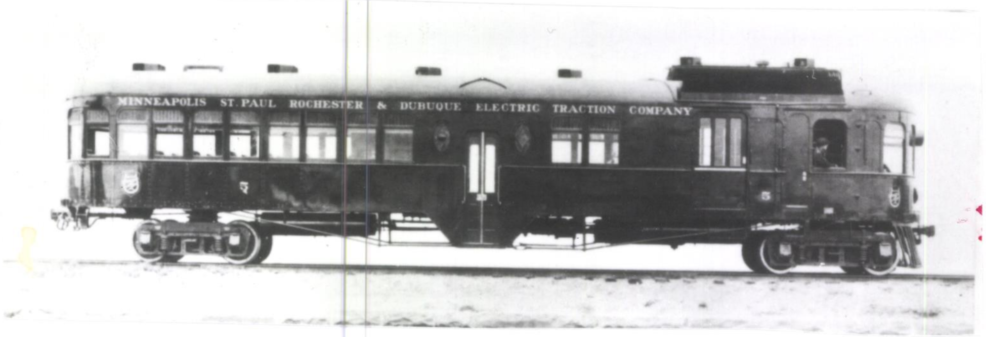
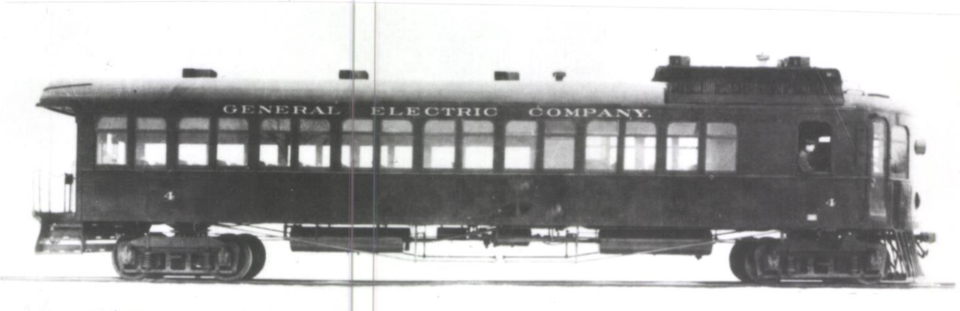
TABLE IV—OPERATING DATA OF MINNEAPOLIS, ST. PAUL, ROCHESTER & DUBUQUE ELECTRIC TRACTION COMPANY—"DAN PATCH LINE"—JAN. 1, 1912, TO JAN. 1, 1913.

Total motor car miles	216,498
Total trailer car miles	75,948
Total car miles	292,446
Per cent of time trailers hauled	35.5
Number of motor cars in service	8
Length of line	37.34
Maximum grade, per cent	1.5
Average grade for 4 miles, per cent	1.34
Schedule time for express trains	1 hr. 17 min.
Average distance in miles between express stops	3.734
Schedule speed of express trains, m.p.h	29.1
Schedule time for local trains	1 hr. 35 min.
Average distance between local stops, miles	1.067
Schedule speed of local trains, m.p.h	23.6
Fuel per motor car mile, gal	0.758
Fuel per car mile	0.527

	Total Cost for Year	Average Cost per Motor Car Mile	Average Cost per Car Mile
Wages of crew	$12,056.95	$0.0557	$0.0412
Fuel (naphtha)	17,622.26	0.0814	0.0603
Lubrication (gas engine)	1,141.56	0.0052	0.0039
Journal oil	77.77	0.0004	0.0003
Supplies and car heating	1,389.03	0.0064	0.0047
Maintenance electrical equipment	1,949.81	0.0090	0.0067
Maintenance cars and trucks	1,349.56	0.0065	0.0047
Shop expenses and heating	3,507.77	0.0162	0.0120
Total	$39,139.71	$0.1808	$0.1338


MINNEAPOLIS ST PAUL ROCHESTER & DUBUQUE ELECTRIC TRACTION COMPANY



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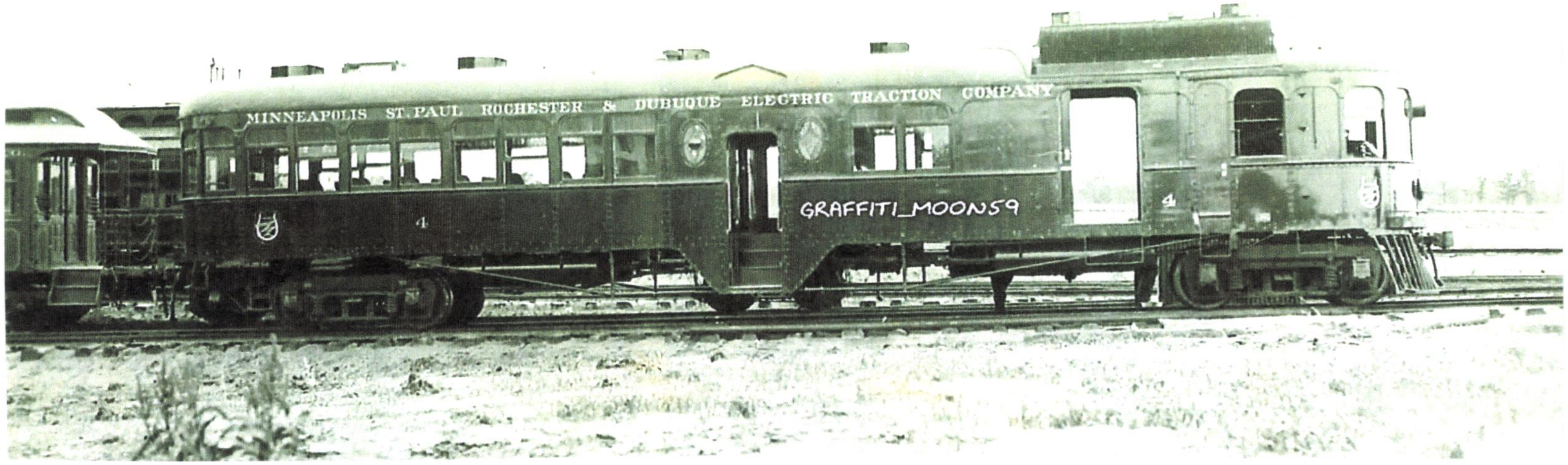
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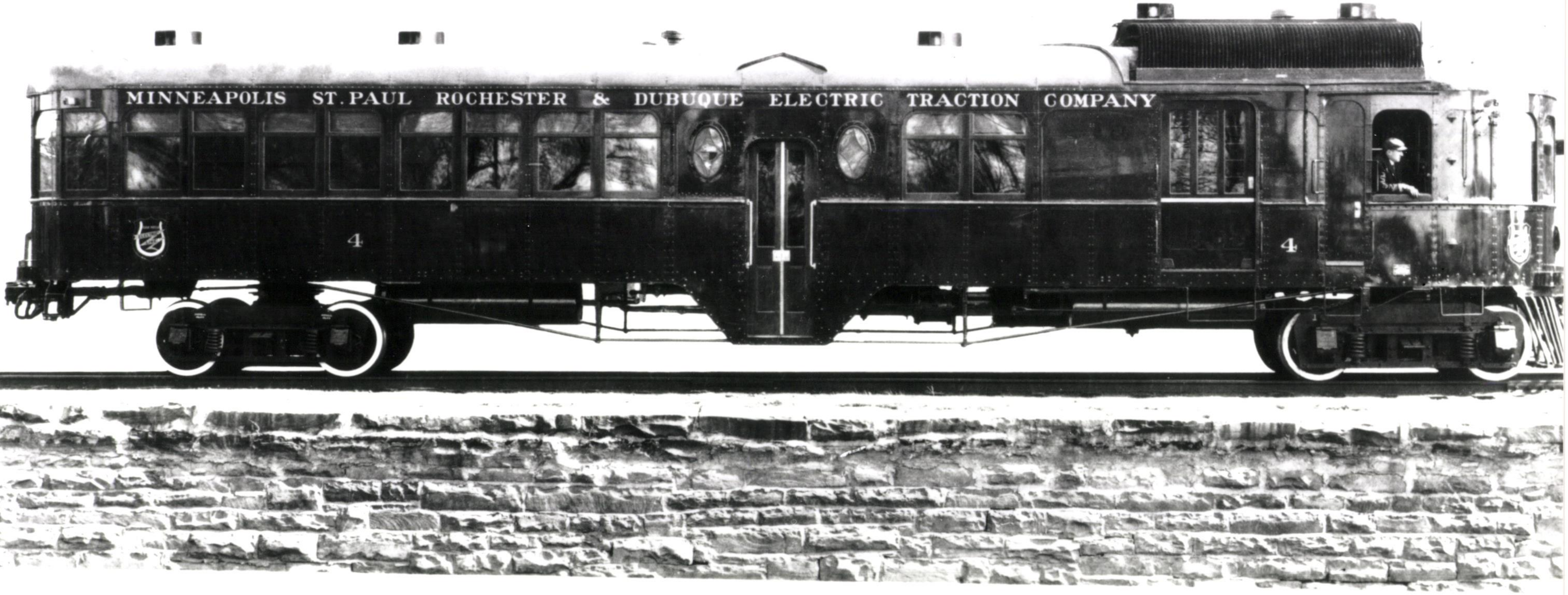
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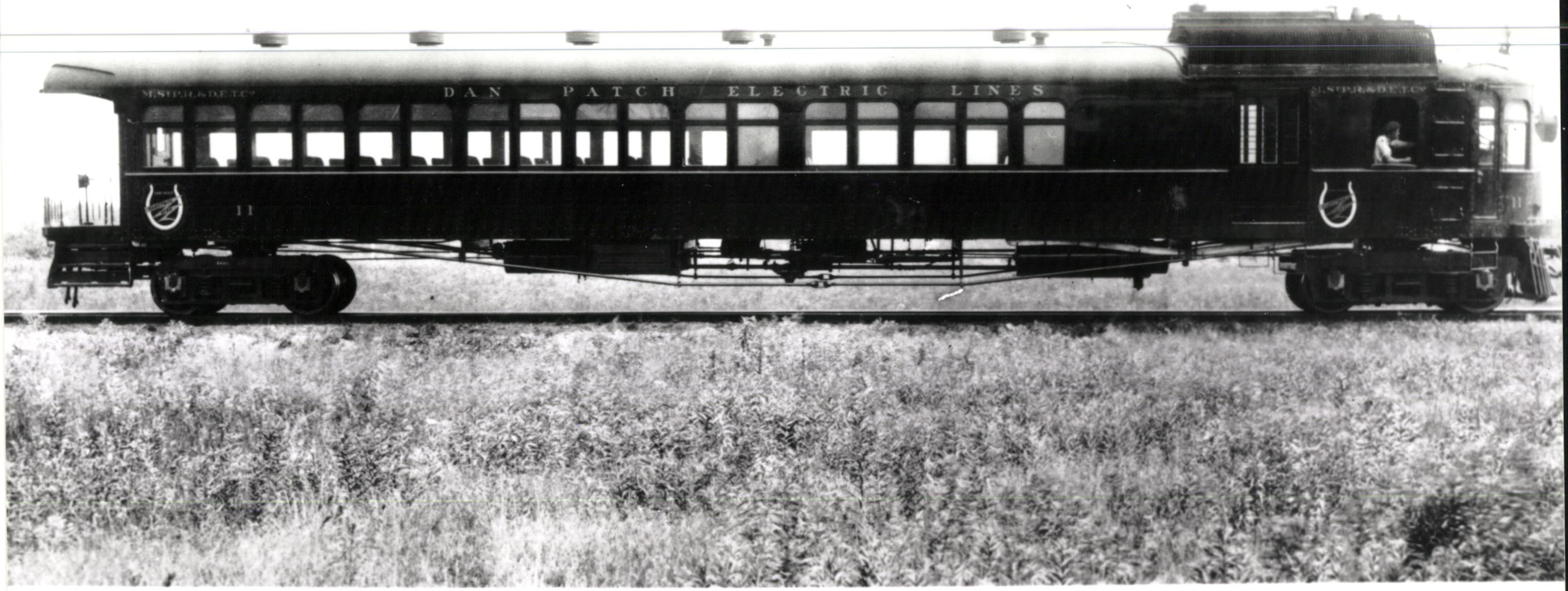
305818 TYPE CE 59 B 8 GAS ELECTRIC MOTOR CAR BUILT FOR MINNEAPOLIS. ST. PAUL,
ROCHESTER AND DUBUQUE ELECTRIC TRACTION COMPANY BY
GENERAL ELECTRIC CO.. SCHENECTADY. N. Y.


M.St.P.R.&D.E.T.Co
DAN PATCH ELECTRIC LINES
11
M.St.P.R.&D.E.T.Co
11

240372 TYPE RE-70-B-11 GAS ELECTRIC MOTOR CAR BUILT FOR THE MINNEAPOLIS, ST. PAUL, ROCHESTER AND DUBUQUE ELECTRIC TRACTION COMPANY BY THE GENERAL ELECTRIC COMPANY.

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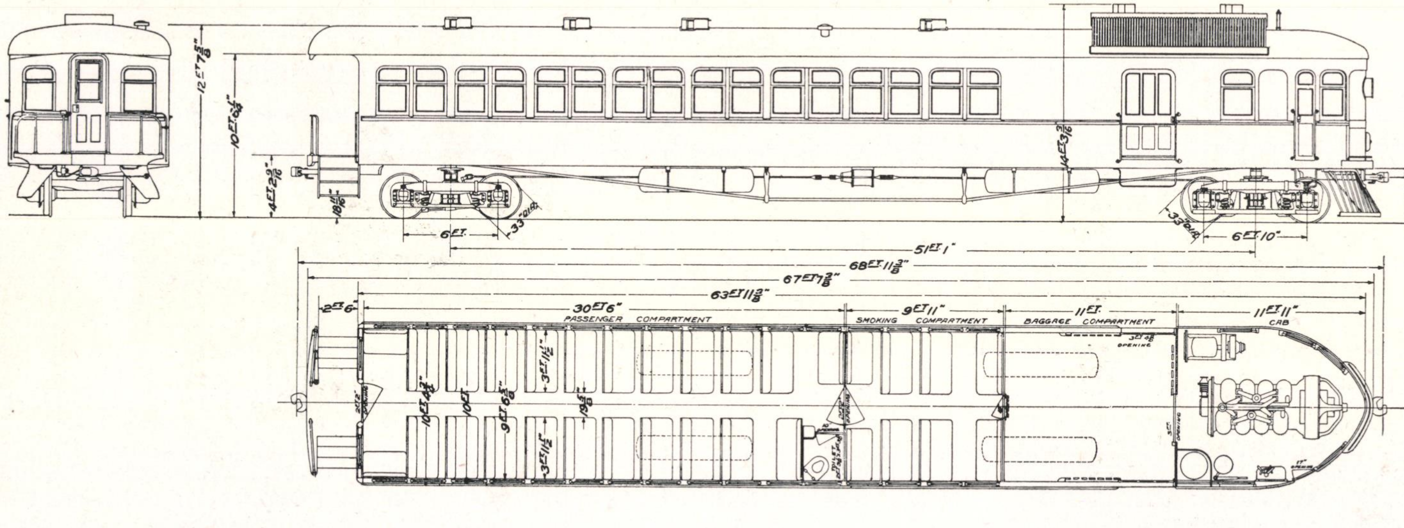
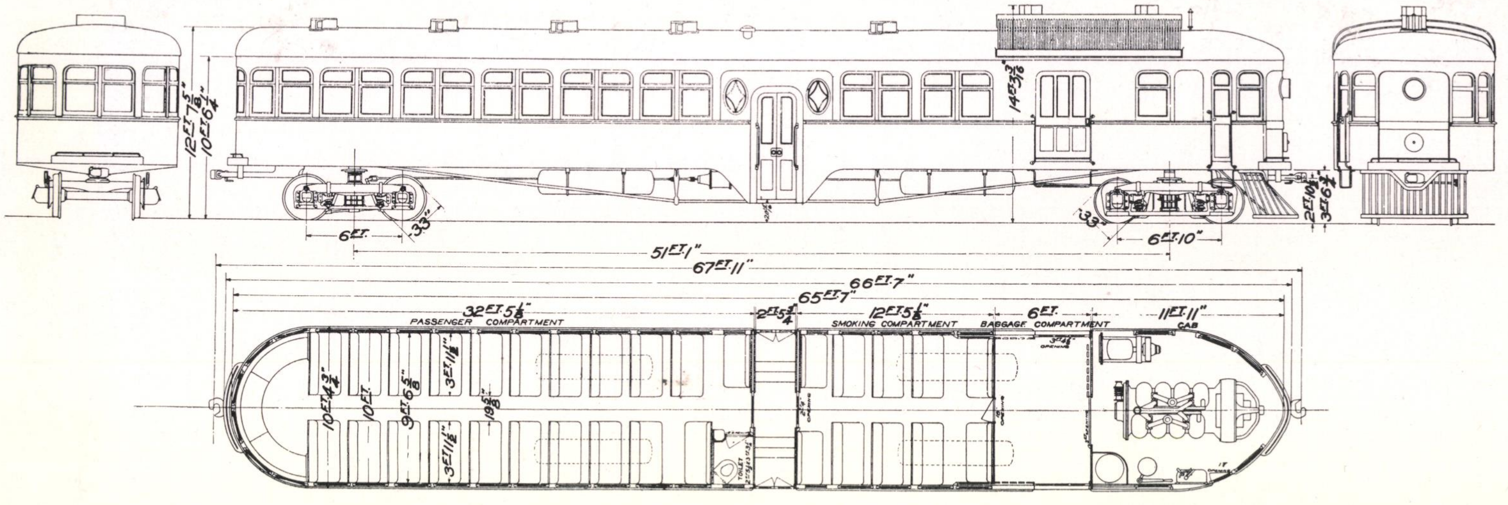
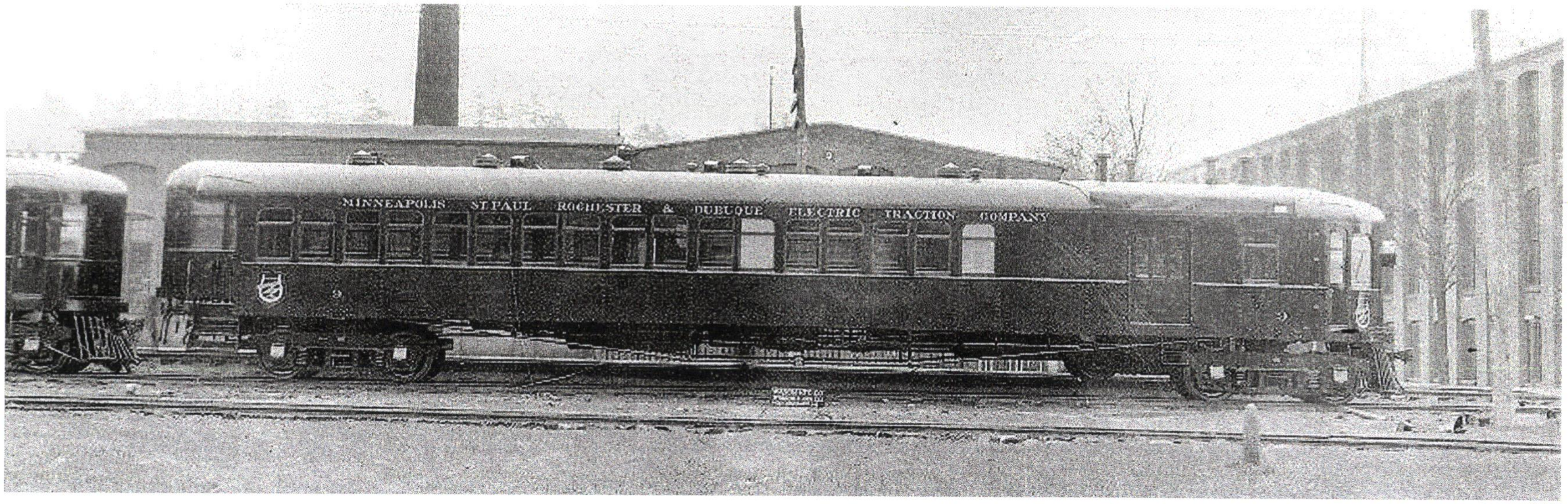

12FT 7 7/8"
10FT 0 1/4"
4FT 2 9/16"
18 11/16"
14FT 3 3/16"
33" DIA.
6FT.
33" DIA.
6FT 10"
2FT 10 1/2"
3FT 6 3/4"
51FT 1"
68FT 11 3/8"
67FT 7 3/8"
63FT 11 3/8"
2FT 6"
30FT 6"
PASSENGER COMPARTMENT
9FT 11"
SMOKING COMPARTMENT
11FT.
BAGGAGE COMPARTMENT
11FT 11"
CAB
3FT 4 5/8 OPENING
10FT 4 3/4"
10FT.
9FT 6 5/8"
3FT 11 1/2"
19 5/8"

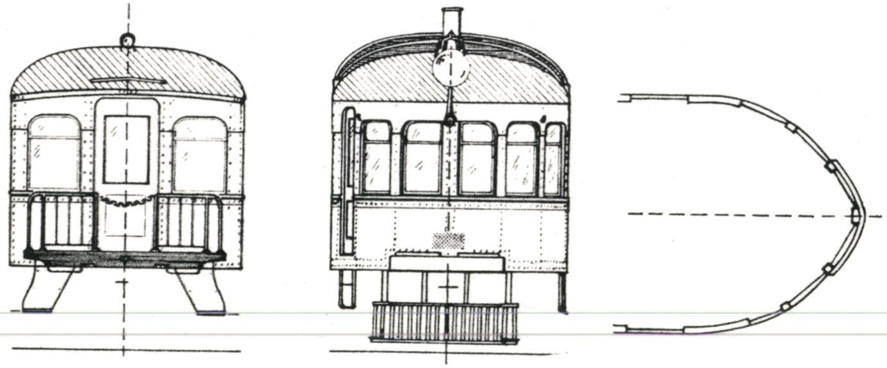
SAN DIEGO & ARIZONA GAS-ELECTRIC MOTOR CARS


12FT 7 5/8"
10FT 6 1/4"
14FT 3 3/16"
6FT.
33"
33"
6FT 10"
2FT 10 1/2"
3FT 6 3/4"
51FT 1"
67FT 11"
66FT 7"
65FT 7"
32FT 5 1/8"
PASSENGER COMPARTMENT
2FT 5 3/4
12FT 5 1/8"
SMOKING COMPARTMENT
6FT.
BAGGAGE COMPARTMENT
11FT 11"
CAB
3FT 4 5/8" OPENING
10FT 4 3/4"
10FT.
9FT 6 5/8"
3FT 11 1/2"
19 5/8"
TOILET


MINNEAPOLIS ST PAUL ROCHESTER & DUBUQUE ELECTRIC TRACTION COMPANY
9

GAS-ELECTRIC CARS

This drawing has been made to the scale of $\frac{1}{8}'' = 1'$
Add 10% for HO, or make double for $\frac{1}{4}''$



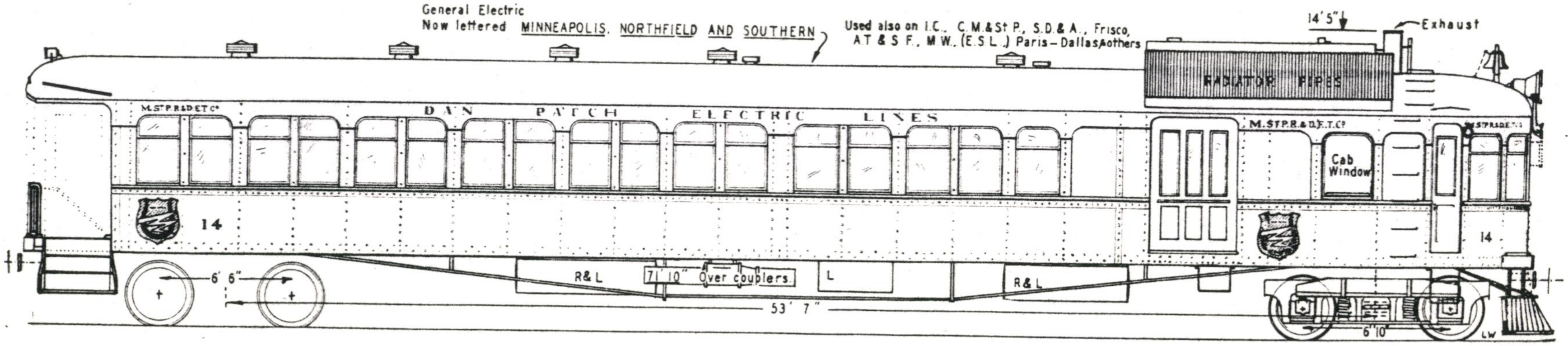
Minneapolis, Northfield, & Southern

A heavy freight road 45 miles long Started under the name "DAN PATCH LINES"* or the MINNEAPOLIS, ST PAUL, ROCHESTER & DUBUQUE ELECTRIC TRACTION CO to give fast passenger service to those points The company built only 45 miles, and that in another direction, but it did build the first 100 % gas-electric line with a fleet of g.-e. locos and cars Buses and autos came and the construction ceased; steam locos were bought and the former inturban line gradually became a freight hauler The car shown below is still used and is nicknamed "The Dan Patch" LW

* Dan Patch was a famous race horse

General Electric
Now lettered MINNEAPOLIS, NORTHFIELD AND SOUTHERN

Used also on I.C., C.M.&St P., S.D.& A., Frisco, AT & S F., M.W. (E.S.L.) Paris–Dallas & others


14' 5"
Exhaust
RADIATOR PIPES
M.StP.R.&D.E.T.Co
DAN PATCH ELECTRIC LINES
M.StP.R.&D.E.T.Co
Cab Window
14
14
6' 6"
R&L
71' 10" Over couplers
L
R&L
53' 7"
6' 10"
LW

APPARATUS-MATERIAL

We recently published a description of a short wheel base motor truck with side frames of steel plate, built by the American Locomotive Company for the United Traction Company, of Albany, N. Y. This same company has recently brought out two other designs, in which the plate frame construction is employed, presenting a number of new and interesting features.

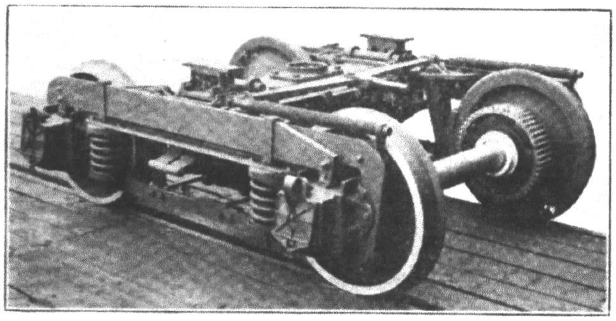
These trucks, one a motor and the other a trailer, were applied to the gasoline-electric car built by the General Electric Company which was described in a previous issue.

The motor truck is designed to carry a load at the center plate of 30,560 lbs. It is equipped with two G. E. 205-B motors, each having a rated capacity of 100 h. p., suspended inside of the axles by the nose type of suspension.

The side frames are machined out of a solid, high tensile strength, ¾-in. steel boiler plate. Cast iron shoes or guides are bolted to the pedestals, on which the journal boxes slide.

A novel feature of the frame construction is that no end frames are used. Lateral stiffness to the frames is provided by the light but stiff cast steel transom gussets which extend well out on the side frames and by longitudinal angles bolted to the frames both inside and outside. The inside angles extend from each transom to the end of the frame and the outside angle extends in one continuous piece between the pedestals.

The transoms are of 10-in. channels weighing 30 lbs. to the foot and are carried on shoulders provided on the cast steel transom end brackets, thus taking the shear off the bolts securing them to the brackets. This same practice is followed throughout in the design and wherever steel castings are used they are made to lap over the parts to which they are connected.



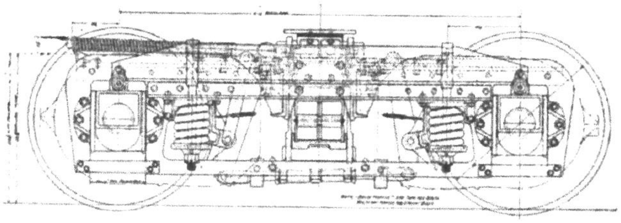
Steel Plate Frame Truck for Gasoline-Electric Car

The bolster is of light but strong construction, being of pressed steel with the upper member made of a steel channel. Canting or tipping of the bolster is prevented by vertical thrust bearings, cast integral with the transom end brackets and raised to the level of the center plate. These thrust bearings also serve to transmit the driving thrust of the motor from the truck side frames directly to the ends of the bolster and through the bolster to the center plate. This relieves the transoms of the driving stress.

Another interesting feature is the design of the spring rigging. The swinging bolster is carried on double elliptic springs, while the weight of the truck is carried by coil springs on the equalizers in accordance with M. C. B. standard practice. In this design, however, a single straight equalizer, machined from a solid bar, is used on each side instead of two forged equalizers as in the ordinary construction of M. C. B. truck. The coil springs are carried on spring seats suspended from the equalizer bar by stirrups and bear against spring caps secured to the leg of the angle bolted to the outside of the frame.

The use of a single straight equalizer simplifies the construction and also provides greater strength than two forged bars of the same weight as any injury to the bar due to internal stresses set up in the metal in forging is eliminated.

The same device is employed in this design for adjusting the angularity of the swing links as was used in the trucks built by the same company for the United Traction Company, of Albany, mentioned before. It consists simply of a special design of seat for the elliptic springs in which three pockets are provided for the swing link rocker, so that, if necessary, the swing link rocker may be shifted from one pocket to the other.



Details of Steel Plate Frame Truck for Gasoline-Electric Car

In this design of the brake rigging, the arrangement of the compression brake release spring is worthy of notice. The spring is guided by a small steel tube which is riveted to the extension of the wrought iron forming the connection to the brake lever equalizer. The end of this piece is threaded and provided with two nuts by means of which the proper compression may be put upon the spring. This makes a very simple arrangement and gives a positive compression spring easily adjusted.

In general, the trailing truck is of the same design as the motor truck, though it has a one-foot shorter wheel base and is of much lighter construction, being built for a load at center plate of 18,200 lbs.

Both of these designs are characterized by a light weight; and, in view of the increase in weight of cars and motors to meet the more severe requirements of modern street and interurban railway service, are of particular interest as representing the possibilities for a reduction in weight of equipment offered by the use of plate frame. The motor truck, with a carrying capacity at the center plate of 30,560 lbs., weighs without motors, wheels or axles, 4,850 lbs., which is about 2,000 lbs. less than an M. C. B. truck of the ordinary construction of the same capacity. This feature alone of the design warrants a careful consideration of it by motive power men.

Some of the principal specifications of the trucks are as follows:

	Motor Truck.	Trailer Truck.
Type	L-378	L-266-T
Gage of track	4 ft. 8½ ins.	4 ft. 8½ ins.
Wheel base	6 ft. 6 ins.	5 ft. 6 ins.
Length over all	8 ft. 3 ins.	6 ft. 11 ins.
Load carried at center plate	30,560 lbs.	18,200 lbs.
Weight without motors, wheels or axles	4,850 lbs.	3,362 lbs.*
Weight complete, without motors	9,000 lbs.	6,850 lbs.‡
Number of motors on each truck.	2	
Type of motor	G.E.205-B	
Horse power, each	100	
Weight of each motor, complete	3,500 lbs.	
Wheels, type	Solid rolled steel	Solid rolled steel
Wheels, diameter	33 ins.	33 ins.
Journals, diameter and length	5x9 ins.	3¾x7 ins.
Maximum operating speed	60 m. p. h.	60 m. p. h.
Radius of shortest curve	35 ft.	35 ft.

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*Weight without axles or wheels.
‡Weight complete.

◆

PHILADELPHIA, PA.—The Sunbury, Lewisburg & Milton Electric Railway Company has been granted permission for the extension of its line from Lewisburg to Milton.

JEANERETTE, LA.—The city council of this city has granted a 25-year franchise to H. Mentz, of New Orleans, for the construction of an electric line, connecting this city with neighboring towns.

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ADDITIONAL ROLLING STOCK FOR THE DAN PATCH LINES

PASSENGER TRAIL CARS, GAS-ELECTRIC CARS AND FREIGHT CARS

THE Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company's lines, popularly known as the Dan Patch Electric Lines, and said to be the first gas-electric road in the world, extend south from the company's terminal building in Seventh Street, Minneapolis, a distance of 107 miles to Mankato, with a branch about midway of the line running northeast from Northfield to Randolph, seven miles distant. Another extension is contemplated from Faribault southeast to Owatonna. Waseca, Geneva, Albert Lea, Austin, Dodge Center, Rochester and beyond, having Dubuque, Iowa, as its objective terminal point.

The fine rolling section of Minnesota thus served by the "Dan Patch Lines," with its productive grain fields, dairy and truck farms and numerous thriving towns and cities of varied industrial activity, is one of the most prosperous in the "Bread and Butter State," and presents a splendid opportunity for the further development of the line.

The present business is large, and that the rate of increase is quite up to the Company's expectations is evidenced by the frequent addition of new rolling stock to its equipment.

Twelve trail passenger cars and forty-five freight cars, of the types illustrated, recently left the plant of The J. G. Brill Company on their own wheels for the "Dan Patch Lines," and two new gas-electric cars were dispatched about the same time from the plant of the Wason Manufacturing Company.

The territory presents few difficulties in road construction, the severest grade on the present line being 2 per cent. The line was built, and improvements are being constructed, with a view to permanency, re-inforced concrete being used frequently in such work. Substantial stations similar to those used by steam railroads are located at the various cities and towns along the route, and smaller stations have been erected every few miles between towns to afford protection to the traveling public from inclement weather.

About twenty-five miles south of Minneapolis, at Orchard Gardens station, several thousand acres of farm land have been divided into five and ten acre tracts by the company and are being sold to residents of Minneapolis and St. Paul, many of whom have erected houses and travel to and from their places of business in the city each day on the company's trains.

Many attractive lakes lie along the route, affording excellent facilities for boating, bathing and fish-

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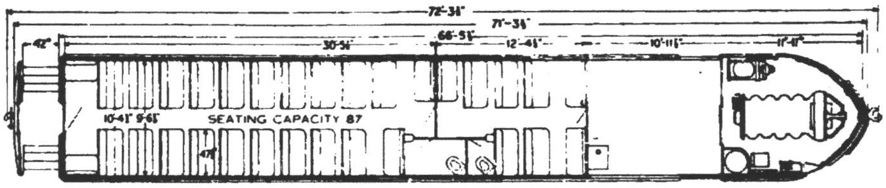


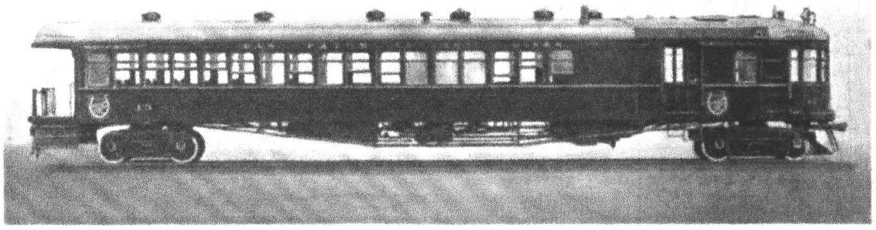
ROLLING STOCK FOR DAN PATCH LINES. Height from track to underside of side sills, 3 ft. 7¾ in.; underside of side sills over roof, 8 ft. 11⅝ in.; floor to center of headlining, 8 ft. 2½ in.; track to step, 18 11/16 in.; risers, 10⅝ in.; weight of body, complete, 32,040 lb.; trucks, 16,640 lb.

ing, and these have lured thousands of city dwellers out into the open country during the summer months, many of them having cottages where they spend the entire season.

Antlers Park, a summer resort and recreation park, thirty miles south of Minneapolis, is owned and operated by the traction company. It has many attractions, including a club-house, dancing pavilion, excellent bathing beach, chute-the-chutes, aerial swing, scenic miniature railway, and all the other attractions usually found at a popular summer resort. Many people spend the entire summer in the cottages, and numerous excursion parties are entertained at the park during the season.

Four through trains each way, daily, one of which is a limited parlor car train, constitute the normal passenger schedule of the road, the limited making the run of 107 miles, including four stops, in three hours and twenty-five minutes; the other trains requiring four hours and five minutes for the same trip. This service is supplemented by local trains between certain points of the line and the terminals, and by excursion trains during the summer season as occasion requires.

One 72-ft. gas-electric car, with a seating capacity of 87, constitutes the normal train; when traffic is somewhat heavy, a trailer is added to this; and for excursions and extra heavy traffic a train made up of trail cars, like those described in this article, and drawn by a 60-



ROLLING STOCK FOR DAN PATCH LINES. These unusually long combination cars were built by the Wason Manufacturing Company and equipped with the General Electric Company's gas-electric system of operation

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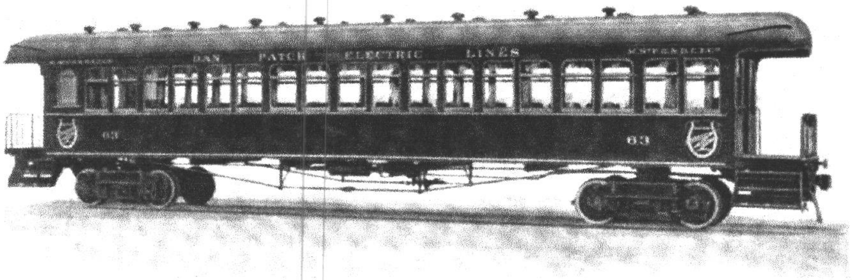


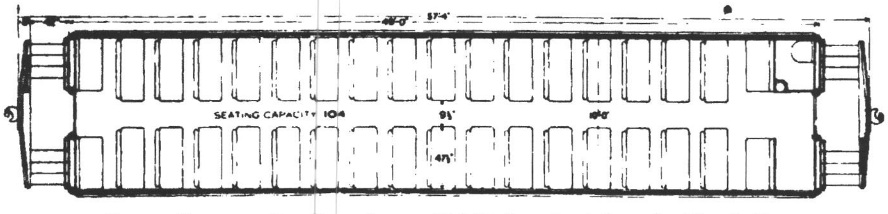
ROLLING STOCK FOR DAN PATCH LINES. Twelve all-steel framed trail cars and steel trucks were built by The J. G. Brill Company

ton gas-electric locomotive, is used.

The twelve trail cars recently received from The J. G. Brill Company are built on an all-steel underframe, the principal members of which are two 6-in. I-beam center sills extending from bumper to bumper, reinforced at each end to a point 3 ft. back of the bolsters by plates riveted to each side of beam; 6-in. channel side sills; channel crossings; oak end sills, reinforced with steel plates on the inside; five pairs of diagonals between bolsters, gusseted to side sills; 6-in. x 3/8-in. plate diagonals from center of bumpers to top of bolsters just inside of the side sills; 6-in. I-beam needle beams and 1¼-in. wrought iron truss rods.

The upper framing is composed of composite corner and side posts of 2 x 2 x ¼-in. tees and ash, and sheathed on the outside with No. 10 sheet steel; the roof, which is of No. 16 galvanized sheets, is supported on steel rafters of 1½ x 1½ x 3-16-in. tees riveted to a 3½ x 2½ x 5-16-in. steel angle top rail on each side. The side windows are of the double type, with stationary upper sash, and with lower sash arranged to raise.

The interior finish is mahogany, with whitewood ceilings. The reversible seats are 47½ inches over all, with 19-in. spring backs and spring edge cushions upholstered with plush; stationary corner seats; oxidized bronze trimmings and parcel racks extending full length of cars; one toilet room in



ROLLING STOCK FOR DAN PATCH LINES. Height from track to underside of side sills, 3 ft. 6¾ in.; underside of side sills over roof boards, 12 ft. 7⅝ in.; floor to center of headlining, 8 ft. 2 in.; track to step, 18 1/16 in.; risers, 10⅝ in.

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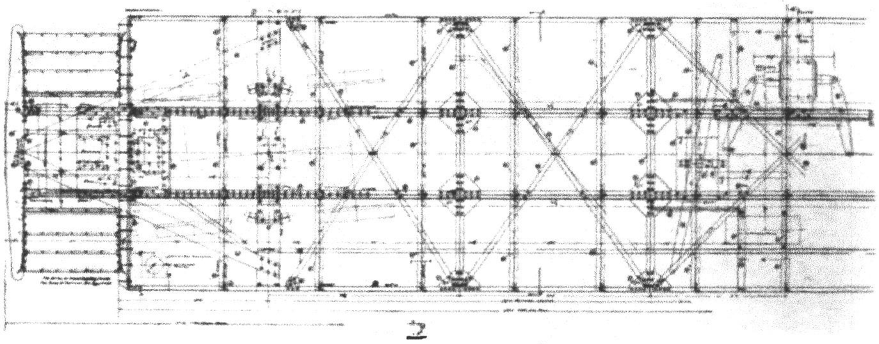
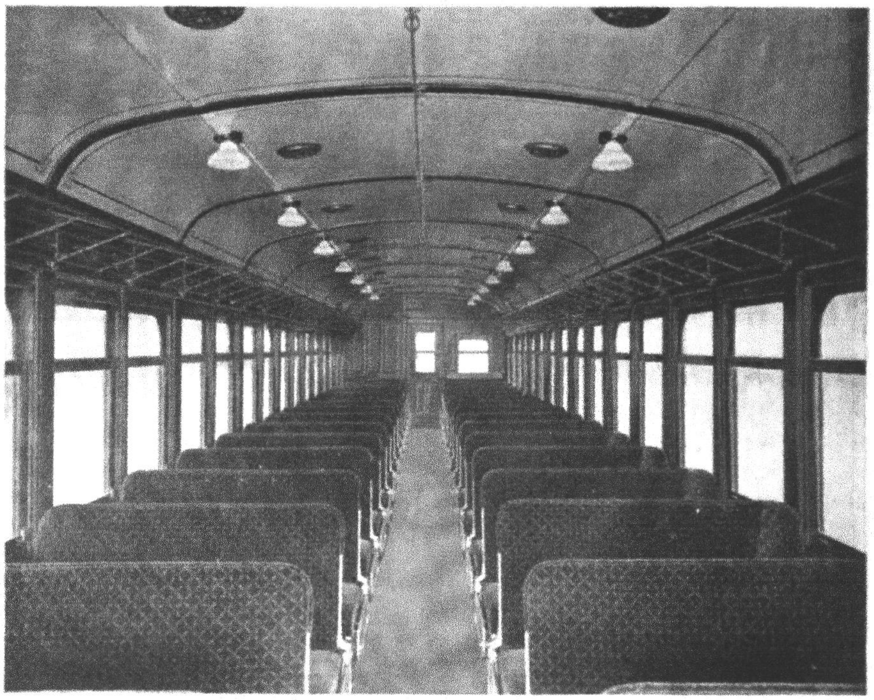


ROLLING STOCK FOR DAN PATCH LINES. All-steel underframe of the passenger trail cars

corner and a water-cooler in alcove outside of each. The cars are mounted on trailer type trucks having a 6-ft. wheel base, 33-in. wheels and 4¼ x 8-in. journals.

The gas-electric cars built by the Wason Manufacturing Company are of the General Electric Company's standard combination passenger, smoking and baggage



ROLLING STOCK FOR DAN PATCH LINES. Interior of the trail cars. The passenger compartments of the gas-electric motor cars have the same appearance. The seats accommodate three passengers each and provide the trail cars with a seating capacity of 104

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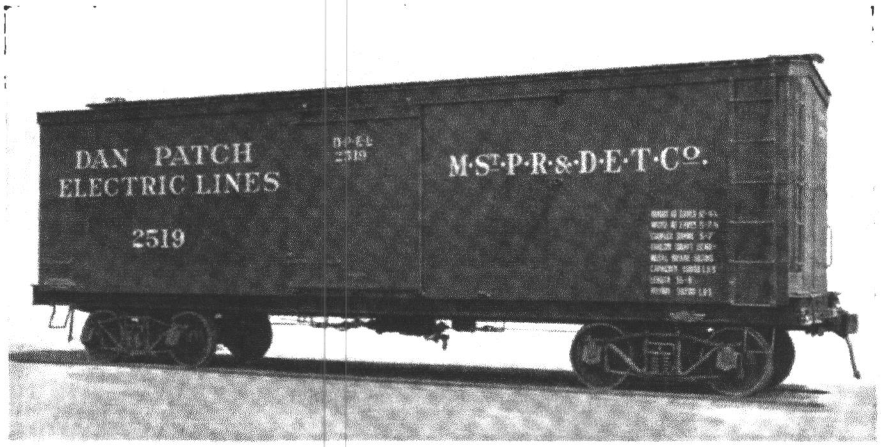

ROLLING STOCK FOR DAN PATCH LINES. Length over end sheathing, 37 ft. 2¼ in.; centers of side posts, 5 ft. 0 in.; width over sills, including sheathing, 9 ft. 2⅛ in.; width over eaves, 9 ft. 7½ in.; height from track to underside of side sills, 3 ft. 7⅛ in.; underside of side sills over roof, 10 ft. 2 in.; weight of body, 25,500 lb.; trucks, 14,000 lb.

compartment type, and are handsomely finished in mahogany. The transverse seats are of sufficient length to accommodate three persons, and are upholstered with plush in the passenger compartment and with leather in the smoking compartment. The total seating capacity is 87 persons.

The all-steel under-frame consists of 7-in. I-beam center sills spaced 3 feet from center to center and reinforced over rear truck by 6 x ¾-in. plates riveted to each side of sill, and braced by 6 x ⅜-in. plate diagonals from center of bumper back to bolster; 7-in. channel side sills, reinforced at the forward end by a steel plate extending from the bolster to a point beyond the first pair of queen posts, to compensate for the interruption of the belt rail by the baggage compartment doors; channel crossings; five pairs of angle diagonals gusseted to side sills; 7-in. I-beam needle beams; and 1¾-in. truss rods.

The upper structure is made up of 2 x 2 x ¼-in. T-posts sheathed on the outside with steel. The plain arch roof is supported on steel rafters, together with the usual wooden car lines. The motor truck has a 6-ft. 10-in. wheel base; 33-in. wheels; 5½ x 10-in. journals; and is equipped with two 100-hp. motors. The rear truck has a 6-ft. wheel base, 33-in. wheels and 5 x 9-in. journals.

The freight cars are 40-ton, 36-ft., box cars with a steel underframe, the principal members of which are center sills of 15-in. 33-lb. channel, spaced 12⅞ inches apart and reinforced with 5-16-in. cover plate and ¼-in. bottom plate; side sills of 12-in. 20½-lb. channel, reinforced with 3 x 3 x ¼-in. angle; end sills of 12-in. 20½-lb. channel, reinforced at center by a malleable iron striking plate;

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bolsters built up of ½-in. web plates, reinforced at top and bottom with 4 x 3 x ⅜-in. flange angles on both sides, 14 x ⅝-in. bottom plate and 14 x ½-in. top plate, with cast steel center plate and malleable iron side bearings; crossings built up of ¼-in. web plates and 6 x ¼-in. tie plates; intermediate floor support of channels connected to side and center sills by 3 x 3-in. steel angles; yellow pine flooring shiplapped to MCB standard section.

The upper structure has yellow pine posts, girths and plates, sheathed and lined with boards of the same material, and tied securely together with ¾-in. tie rods; the roofing is of yellow pine boards extending from side plates to ridge pole of same material, which is supported on pressed steel carlines and secured to end plates at both ends of car; corrugated iron inside metal roof; solid sliding side doors, with track and fasteners of standard type.

The cars are all fitted with MCB automatic couplers with 5 x 7 shank and 8½-in. ends, and mounted on trucks having a 5-ft., 4-in. wheel base, 33-in. wheels and 5 x 9-in. journals.

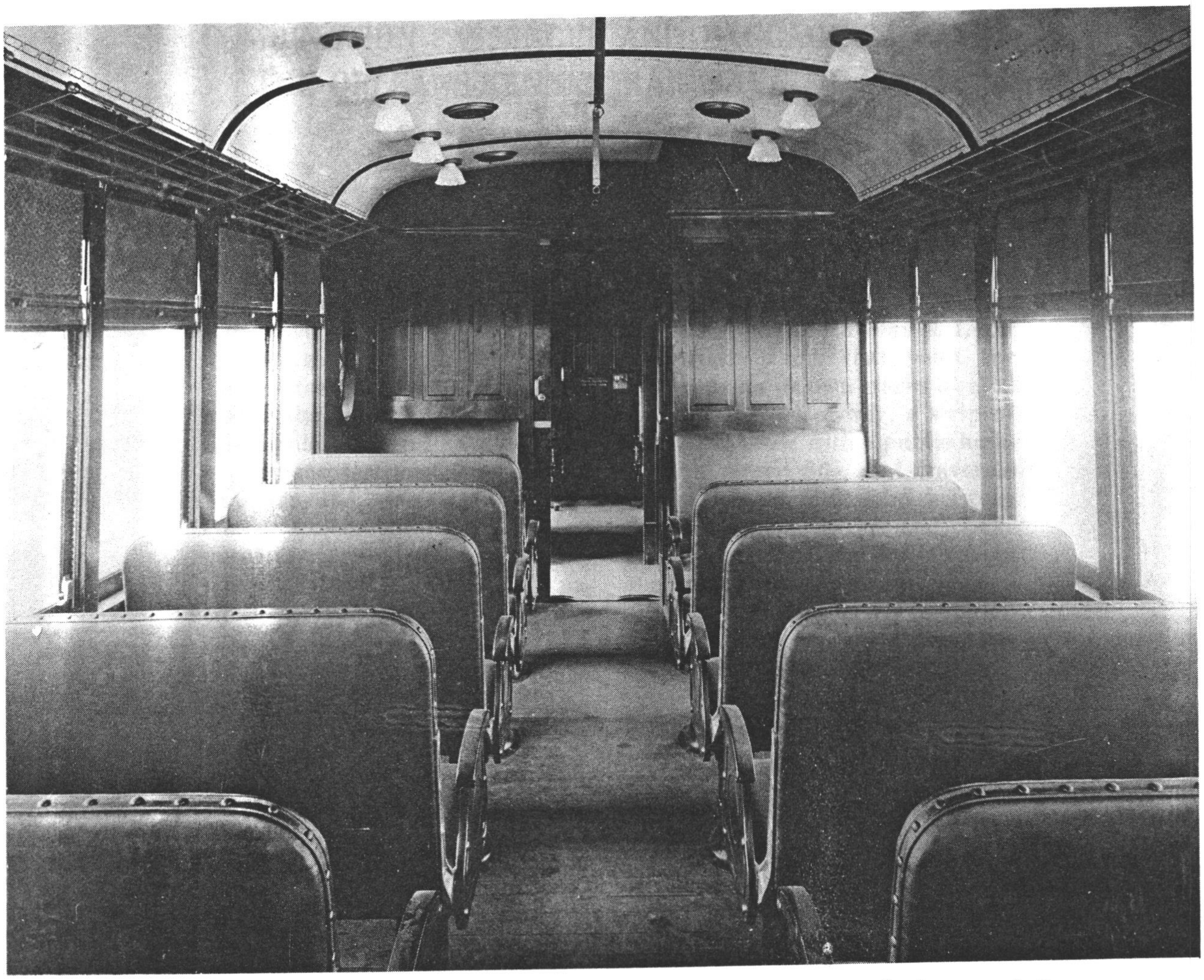


Figure 8.26 Interior of a G.E. gas-electric of about 1910. Most of the bodies were built by the Wason Car Company (General Electric Company)

The New Gas-Electric Locomotive of the Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company.

(Staff Article.)

The first gasoline-electric locomotive ever built is expected to be in operation on the Dan Patch Electric Line, an electric suburban railroad which operates between Minneapolis, Minn., and Northfield, Minn., after May 1st. 1913. A general view of the proposed locomotive is shown herewith.

This new gas electric locomotive will be 39½ ft. long, 20 ft. between truck centers, 6 ft. 10 ins. wheel base, 12 ft. 8 ins. high from rail to roof, 14 ft. 8 ins. high from rail to top of radiators, 3 ft. 7 ins. high from rail to floor line. The diameter of each of the eight drive-wheels is 33 ins. The car is to be of all steel construction. It will develop a maximum of 640 H. P. from its two gas electric engines, with a normal capacity of 250 H. P. each. This new type of gas electric locomotive will also contain an air compressing set and lighting generator, capable of lighting 10 passenger coaches with 20 16-candle power lamps each.

The information here given was furnished by Mr. Charles A. Parker of the staff of the general manager of the Dan Patch line. Mr. Parker makes the following statements with reference to the economic advantages anticipated from the use of the gas-electric locomotive as compared with the steam locomotive and trolley and third rail motor equipment.

GENERAL COMPARISON OF GAS-ELECTRIC AND STEAM LOCOMOTIVE.

The weight of the gas-electric locomotive will be 54 tons, as against the weight of the average steam locomotive of 115 tons. This means a smaller ratio of fuel required to maintain an equal ratio of tractive effort and speed. The gas-electric locomotive will carry two 200-gal. tanks for gasoline. The weight of these tanks when filled will be 12,000 lbs., as against the weight of an engine tender of 33,000 lbs.

The radiators at the top of the gas-electric locomotive will hold about 500 gals. of water, weighing about 4,000 lbs. This would be all the water required to run a gas motor a month. The tender of a steam locomotive has a capacity of from 10 to 15 tons of coal, which is held to be sufficient to run the locomotive for a distance of 150 miles. In other words, in a trip to Chicago from Minneapolis, a steam locomotive would be required to make at least three stops in order to take on water and recoal, while the gas-electric locomotive could run this distance of 500 miles without a single stop.

Each of these stops for the steam locomotive would require additional men, crews and equipment to rewater and recoal the steam locomotive. To make such a trip it would also require, for the steam locomotive, both an engineman and fireman. For the gas-electric locomotive only a motorman would be required. During each time that a steam locomotive would be standing still, taking on water and recoaling, the steam and power would have to be kept up just the same, which means an additional ratio of waste power. When the gas-electric locomotive is not running, all power is shut off and there is no waste of power.

In the gas-electric locomotive, two separate units have been provided for in the engine. Each of these units contains 8 cylinders, or 16 in both. When the locomotive is pulling three or four cars, the use of but one of these engines will be required; but when double that number of cars are to be hauled, 16 cylinders are placed in service by simply turning a valve. In other words, it is necessary to place in service only such power as the weight of the train load requires.

The locomotive body is so constructed as to have a compartment in the center of the car, capable of carrying 10 or 15 tons of freight, and making an additional freight capacity to the regular train.

A large portion of the weight of a steam locomotive is on the pony truck, while practically all of the weight of the gas-electric locomotive is directly on the drive wheels. This permits of a very much greater ratio of efficiency in tractive effort. The usual wheel base of a steam locomotive is from 12 to 25 ft., while the wheel base of the gas-electric locomotive is but 6 ft. 10 ins., making it capable of taking a much sharper curve than can be done by the steam locomotive. The new gas-electric locomotive can be operated by either engine from either end, there being a controller on each end and brake valves.

The lower the wheel on a railroad locomotive, the greater the tractive effort, and as the wheel diameter on the gas-electric locomotive is but 33 ins., as against the wheel diameter of the average steam locomotive of about 6 ft., the marked advantage in favor of the gas electric machine in this respect is obvious.

The time saved in stopping and starting a railroad train propelled by a gas-electric locomotive over that of a steam locomotive is very marked. It costs about 5 cts. to make a station stop for a gasoline-electric train, and from $1.50 to $2.50 to do the same thing with a steam railroad train.

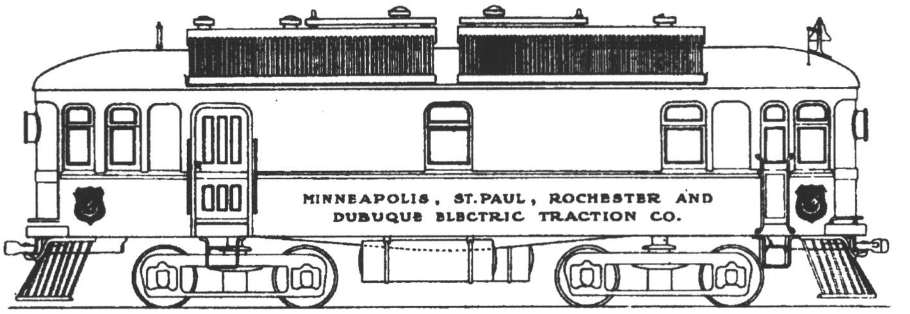
As an illustration of the time saved. in a trip from Minneapolis to Northfield, with say possibly 20 stops, an average of more than one minute per each stop can easily be saved, thereby cutting the running time 20 minutes when compared to steam operation.

REPAIR AND TROUBLE COMPARISONS OF STEAM AND GAS-ELECTRIC LOCOMOTIVES.

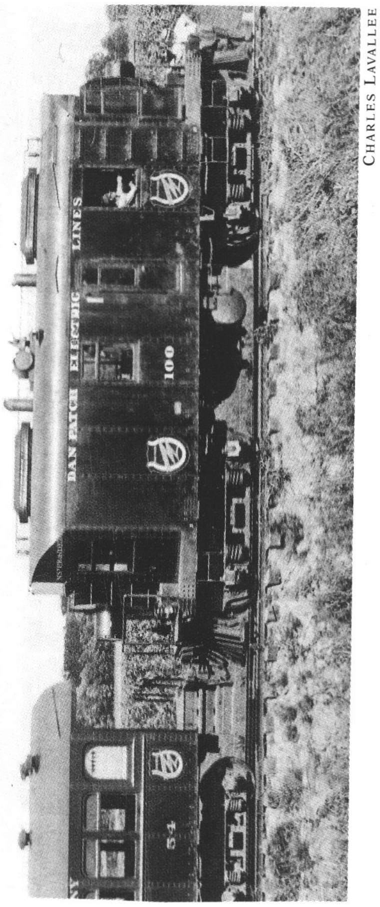
An additional generator is attached to the gas-electric locomotive handled with an air compressing set and lighting generator combined, for lighting trains. Many steam locomotives have a steam turbine attached to the boiler for lighting passenger coaches, which makes an additional equipment to carry and additional trouble and expense to the maintenance.

The gas-electric locomotive has no main rod brasses, no main or side rods, no eccentrics, no boilers to leak, no tenders to freeze in cold weather, no flues to blow out, no boiler to wash out every three weeks, no crown sheet to burn out, which sometimes kills firemen and engineers, and no danger of scalding employes by the bursting of steam pipes. Additional advantages of the gas-electric locomotive is that it has five less pair of wheels to be kept in repair, it can be filled, gassed and oiled in 15 minutes, it has no fires to be cleaned, tanks to be filled with water and coal or lubricators to be filled with oil, it does not require a hostler to clean the fire, or two men at the coal chute to load coal, or two men in the ash pit to take ashes out of the ash pan, or two men or gas engine at the turn table as in handling steam locomotives. The operator of the gas-electric locomotive takes care of his own machine.

The engine base of the gas motor holds 20 gals. of oil, which will run the gas electric locomotive ten days without refilling. A valve is turned on from the standpipe in the shop of the gas-electric locomotive, and in five minutes the gas tank is filled.


MINNEAPOLIS, ST. PAUL, ROCHESTER AND DUBUQUE ELECTRIC TRACTION CO.

General View of the New Gasoline-Electric Locomotive for the Dan Patch Electric Line.



CHARLES LAVALLEE

GENERAL ELECTRIC CO.
GAS-ELECTRIC LOCOMOTIVES

No.	G.E. Serial Number	Date Built	Wason Order Number	Engines (two) Type	Motors (four) Type	Weight
100	3763	6-13	13515	GM-16C4	205D	114,000
101	3786	6-15	16503	GM-16C5	205D	125,760
102	3787	6-15	16503	GM-16C5	205D	125,760
103	3788	7-15	16503	GM-16C5	205D	125,760

Details on Number 100

Shipped from Erie, Pennsylvania, 7-2-1913; arrived in Minneapolis 7-4-1913.

Length overall 36' 4", length over cab 27' 0", width 10' 5 7/8", height over roof 12' 10 5/8", and height overall 14' 6 3/4". The underframe was built by Erie Steel Construction Co. and the carbody by Union Iron Works, both of Erie, Pa.

The two engines were V-8's with 8" x 10" cylinders, rated at 175 h.p. each at 550 r.p.m. These engines were cranked by admitting low pressure air to the cylinders. This drove the engine as compressed air engine until it fired on gasoline. A 25 c.f.m. electric motor driven air compressor powered from the locomotive storage battery supplied starting air. Each engine had a built-in 22.5 c.f.m. air compressor which supplied air to the locomotive when the engines were running. After one engine started, the output from its generator could be used to motorize the generator of the other engine for cranking purposes.

Each engine was direct-connected to a G.E. 8-pole compound wound main generator. The generators were parallel-connected so that all traction motors were supplied from a common bus. With this arrangement all four motors could be supplied from one or both power plants. Either or both engines could be controlled from either end.

Each power plant had its own radiator and fan assembly that consisted of a large circular radiator and axial flow fan that was shaft driven from its respective generator. The radiator assembly was externally mounted in a cylindrical housing on the front of the body at each end.

Auxiliary power was supplied by a G.E. Model GM-23 four-cycle 3" X 6" gasoline engine, rated at 10 h.p. at 750 r.p.m. directly coupled to a 5 KW 65-volt generator. This generator supplied excitation for the two traction generators, powered the motor-driven air compressor, charged the storage batteries that supplied lighting and control requirements on the locomotive, and provided current for lighting up to three or four passenger trailers. This auxiliary engine was located between the two V-8's in the center of the cab.

The Wason RM54B trucks, 6' 10" wheelbase, 33" wheels, were each mounted with two G.E. 205D motors, rated at 100 h.p. each, with 17:58 gearing. The two motors on each truck were wired in parallel and the pairs of motors connected by the controller, first in series, then in parallel. Two 15-point series-parallel controllers were provided: seven series points, six full-field parallel points and two shunted-field parallel points.

Fuel capacity was 300 gallons in under-floor storage tanks. Starting tractive effort was 30,000 pounds; at 10 m.p.h. 8,000 pounds. Minimum curve radius was 100 feet. Speed was rated at 38 m.p.h., but #100 achieved 51 m.p.h. running light, and 45 m.p.h. with a five-car train. Number 100 was used in freight service between Minneapolis and Mankato.

This locomotive was claimed by G.E. to be the first in the world powered with an internal combustion engine that transmitted power to the wheels through electric motors. However historians have determined that a 30" gauge 22-ton diesel-electric built in late 1912 was actually the first.

Number 100 was damaged in a head-on collision with passenger motor car number 7 between Orchard Gardens and Lakeville in 1914. Repairs were undertaken in the 60th St. Shops. In the process the damaged end was modified. The cab was extended to fully enclose the former open platform, which was also squared off. A finned-tube, convection-cooled, roof mounted radiator (as used on the passenger motor cars) replaced the mechanical radiator. Presumably this was done to get the locomotive back in service as soon as possible. A standard roof mounted radiator would be readily available from G.E. whereas the mechanical radiator would need to be specially fabricated.

Details on Numbers 101-103

101 and 102 were shipped from Erie, Penna., 6-26-1915 and 103 on 8-2-1915.

Length overall 40' 0", length over body 34' 0", width 9' 6", truck centers 24' 0", and height overall 15' 2". The locomotives were built with the box type cab extending almost the full length of the underframe, which was built for unusually heavy service. Four longitudinal 10" 30 lb. channels were used, two for the side sills and two for the center sills. These sills extended the entire length of the frame and were tied together by heavy end frame steel bumpers and bolster plates, each channel being riveted to the webs of the end frame castings and bolted to the top and bottom bolster plates. The bolsters were built up of 12" x 1 1/8" steel plates, the bottom plate being carried across the frame and riveted to all four longitudinal sills. The steel center plate castings were bolted to the bolster plates, and cross sills were riveted in where needed to support equipment hung below the frame. In the upperframe of the body, side posts and rafters were of "T" iron and angles covered with steel plates having lap and butt joints.

The locomotives were arranged to be operated from both ends. The generating sets and controllers (two G.E. P-35-A) were installed in each end of the cab, with the auxiliary lighting set, air compressor and storage tanks grouped in the central section. For facilitating the installation of the generating sets and other equipment, the ends of the cab were constructed so they could be removed. Westinghouse automatic air brakes were provided.

Mechanical, electrical and operational data were identical to those of number 100, except for tractive effort. The maximum tractive effort was 32,200 pounds. The performance of the locomotives showed a tractive effort of 16,000 pounds at 5 m.p.h., 3,500 pounds at 30 m.p.h., and 1,000 pounds at 50 m.p.h.

Disposition of the Gas-Electric Locomotives

Number 100 was sold in late 1917 to the Central Warehouse Company, St. Paul, for switching service on that company's industrial trackage. CWC converted it to straight electric operation in 1918. Re-sold 1922 to the Minneapolis, Anoka & Cuyuna Range Railway. MA&CR converted it to diesel-electric operation in August, 1957. The MA&CR was purchased by the Great Northen Railway in December, 1966. In 1967 the GN Ry. donated number 100 to the Minensota Transportaton Museum.

Numbers 101-103 were sold 11-14-1916 to the Southern Pacific Railway. Number 100 went to the Pacific Electric Ry. as 2nd 1501; 102-103 went to the Visalia Electric Ry. as their 402 and 401 respectively.

PE 2nd 1501 (101): placed in storage at Torrance 6-14-1939. Loaned to Visalia Electric Ry. May through July, 1940, when VE 401 needed engine repairs. Returned to PE and again stored. Put back in service May, 1942, and used for about a year until replaced by a new G.E. 44-ton diesel-electric locomotive. Again put in storage. Scrapped September, 1944.

VE 402 (102): Sold to Pacific Electric Ry. as their 1502 8-17-1918 (PE) or 11-13-19 (VE). Stored at Torrance 6-14-1939. Scrapped September, 1944. A VE Ry. representative was on hand when 2nd 1501 and 1502 were scrapped to get parts for VE 401.

VE 401 (103): Scrapped by Southern Pacific Ry. in Sacramento 1951 (not 1946).

STEAM LOCOMOTIVES

Numbers 200-202.

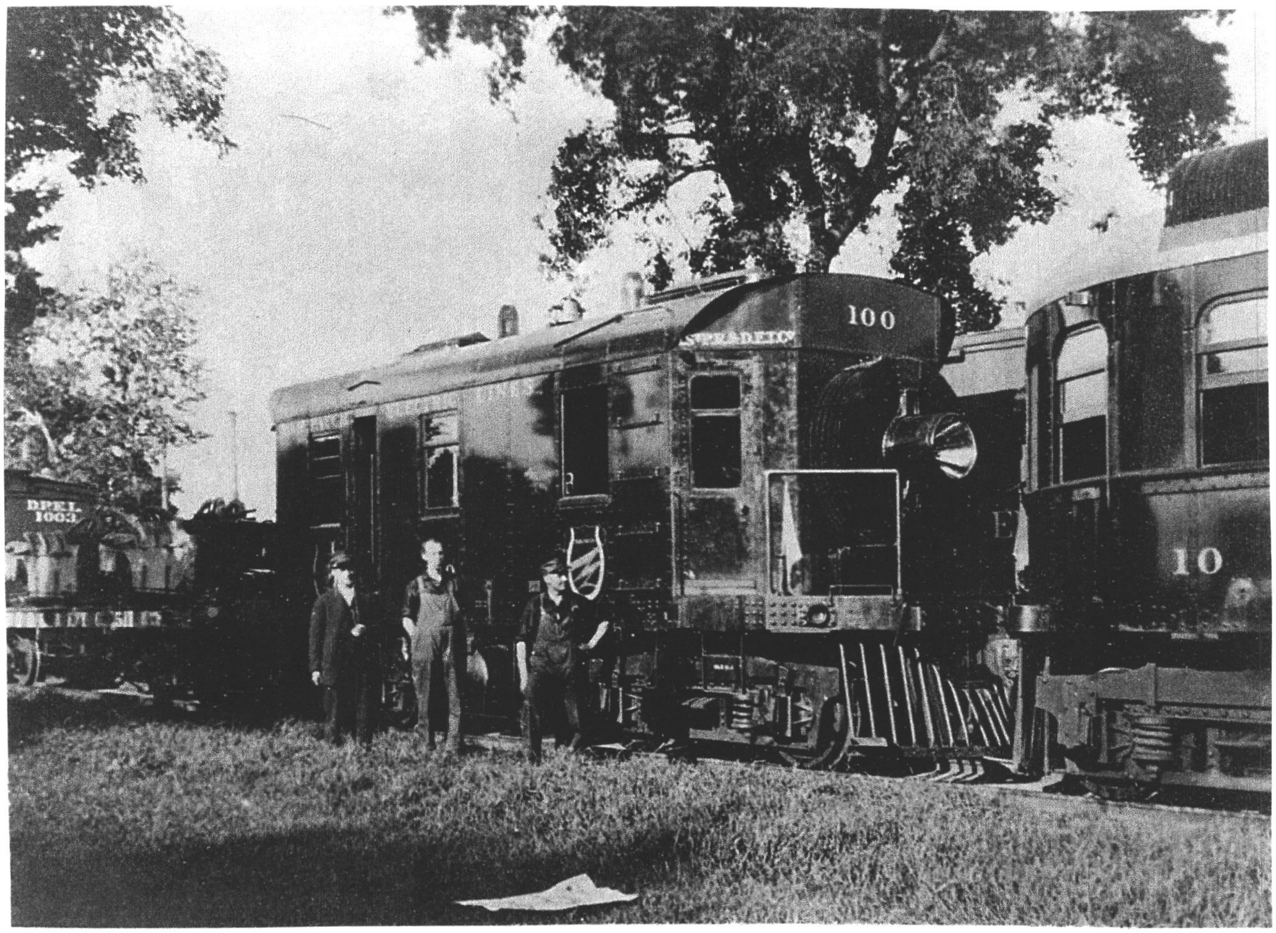
2-6-0 type built September, 1914, by the H. K. Porter Co., Pittsburgh, Penna. 18" x 24" cylinders, 51" diameter driving wheels, 175 p.s.i. steam pressure, 23,790 pounds tractive effort, and total weight 96.5 tons. BUILDER'S NUMBERS 5602-5604

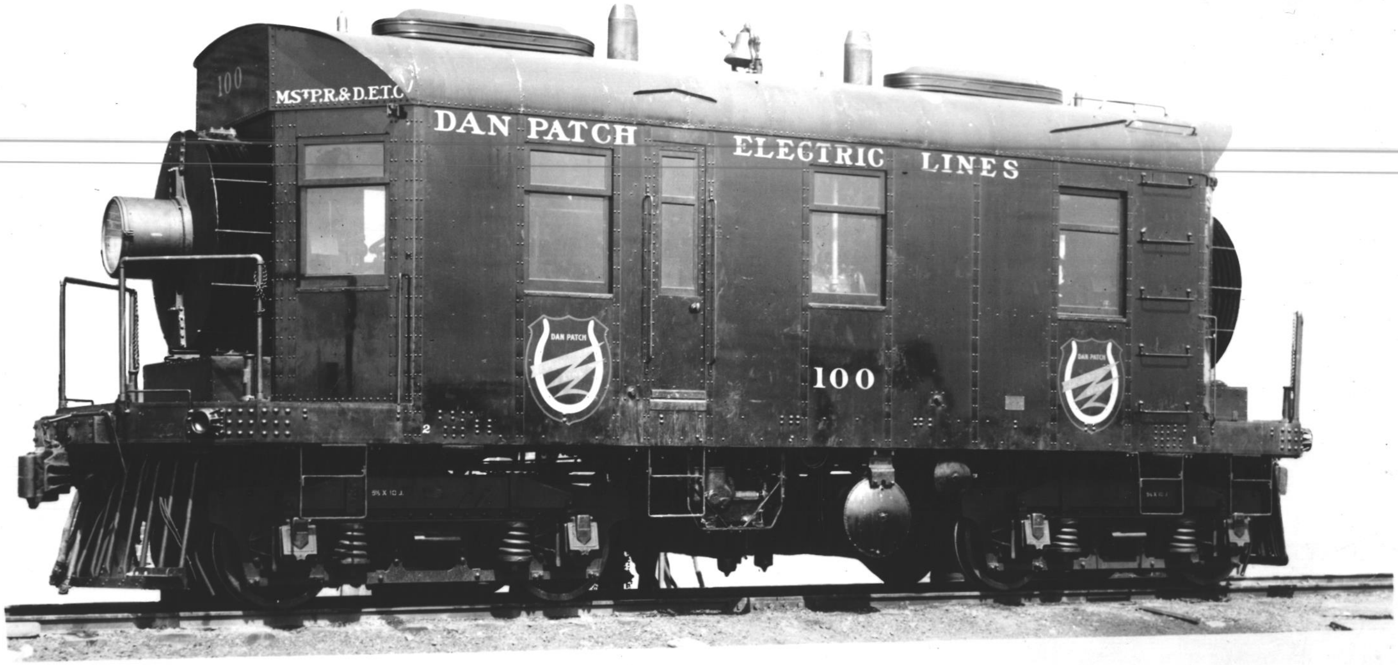
Disposition of the Steam Locomotives

200: purchased with the railroad by the MN&S Ry. in 1918.

201: sold to the Electric Short Line Railway in 1916.

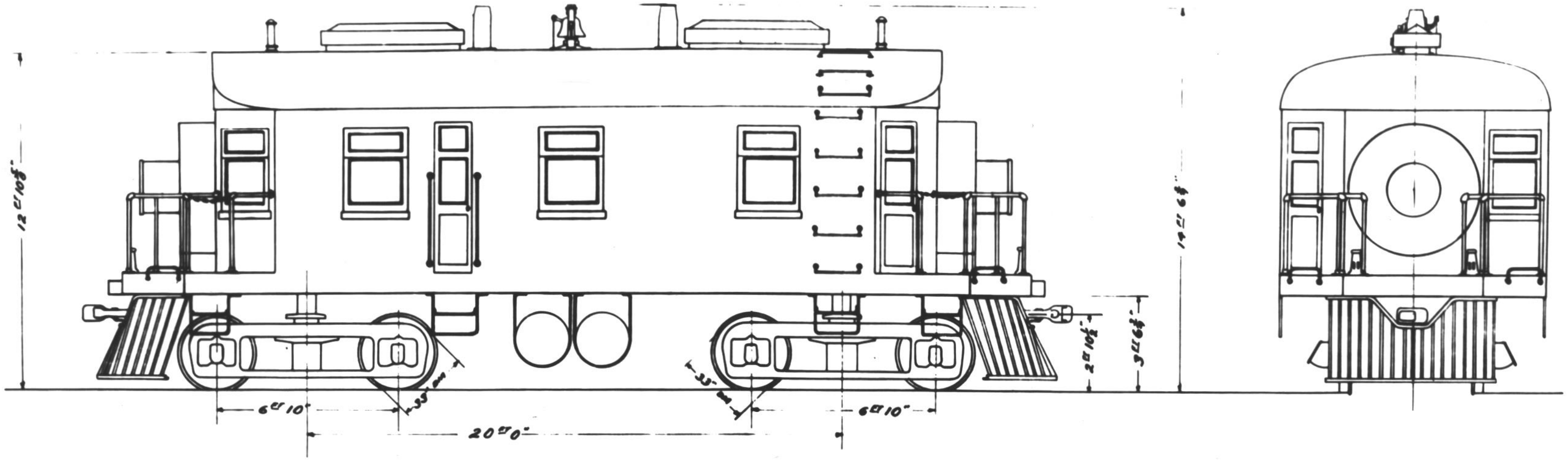
202: sold in 1916 to the Kansas City, Mexico & Orient R.R. as their #3. Re-sold March, 1920, to the Chihuahua Pacific R.R. as their #3.

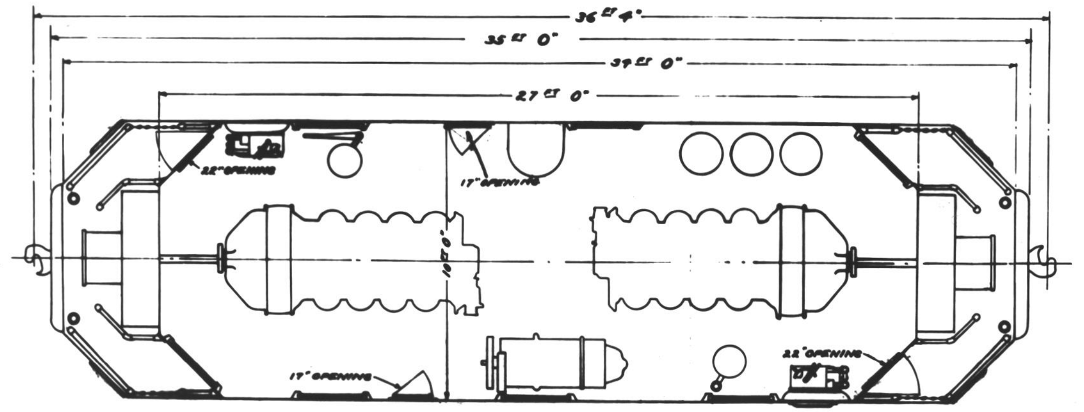



100
MStP.R.&D.E.T.C
DAN PATCH ELECTRIC LINES
DAN PATCH
100

340049 TYPE 404-G-110-4-GE-205-D GAS ELECTRIC LOCOMOTIVE BUILT
FOR THE MINNEAPOLIS, ST. PAUL, ROCHESTER AND DUBUQUE
ELECTRIC TRACTION COMPANY BY GENERAL ELECTRIC COMPANY.

INDEX E-318.34


12 FT 10⅝"
14 FT 6⅞"
3 FT 6¼"
2 FT 10½"
33"
6 FT 10"
20 FT 0"
6 FT 10"
33"


36 FT 4"
35 FT 0"
34 FT 0"
27 FT 0"
22" OPENING
17" OPENING
10 FT 0"
17" OPENING
22" OPENING

This was the
◁ damaged end

[illegible]	[illegible]	GENERAL CHANGE

OUTLINE

FIRST MADE FOR GAS ELECTRIC LOCOMOTIVE, 404-G-110-4GE205-D

DRAWN BY [illegible] TRACED BY [illegible]

CHECKED BY [illegible] APPROVED BY [illegible]

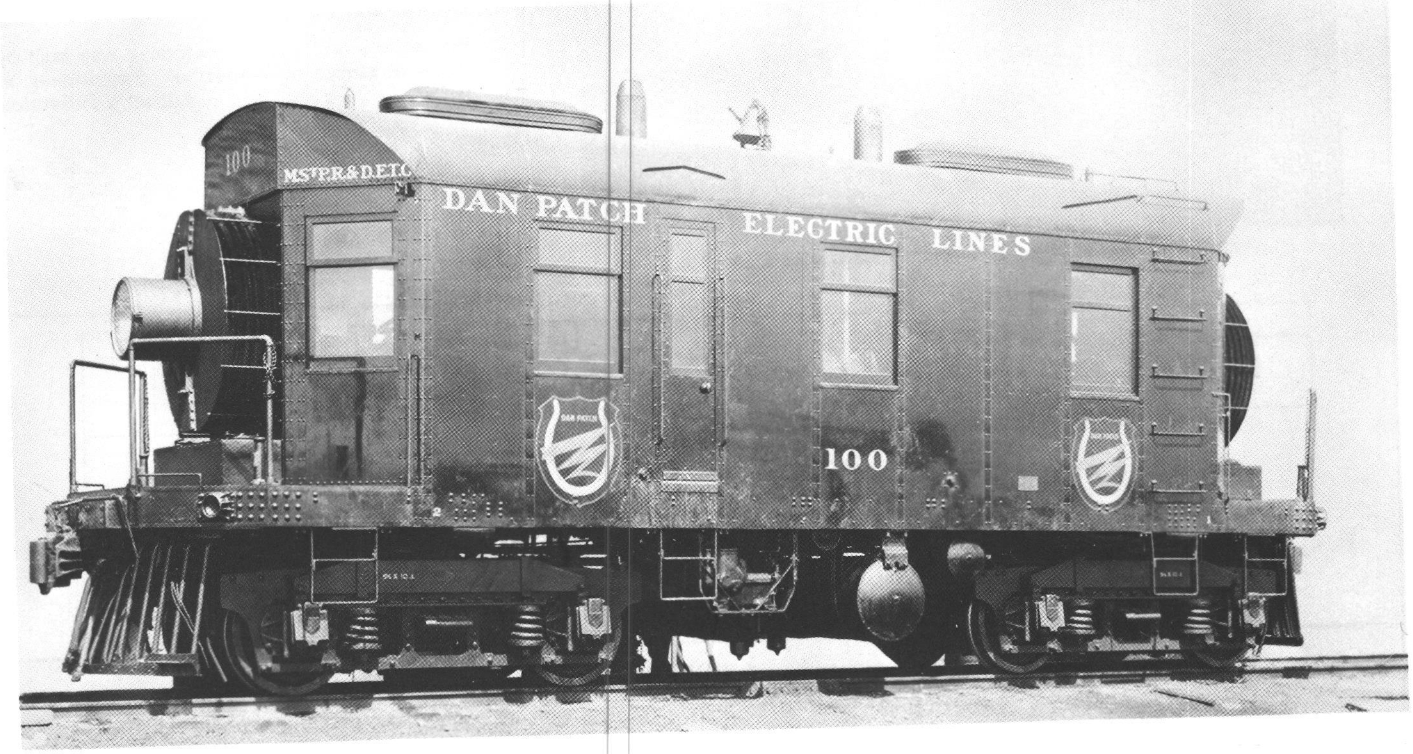
GENERAL ELECTRIC CO.
ERIE, PA.

P-705135

G. PA.

340361 OUTLINE TYPE 404-G-110-4GE205D GAS ELECTRIC LOCOMOTIVE.

INDEX E-318.34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DAN PATCH ELECTRIC LINES
DAN PATCH
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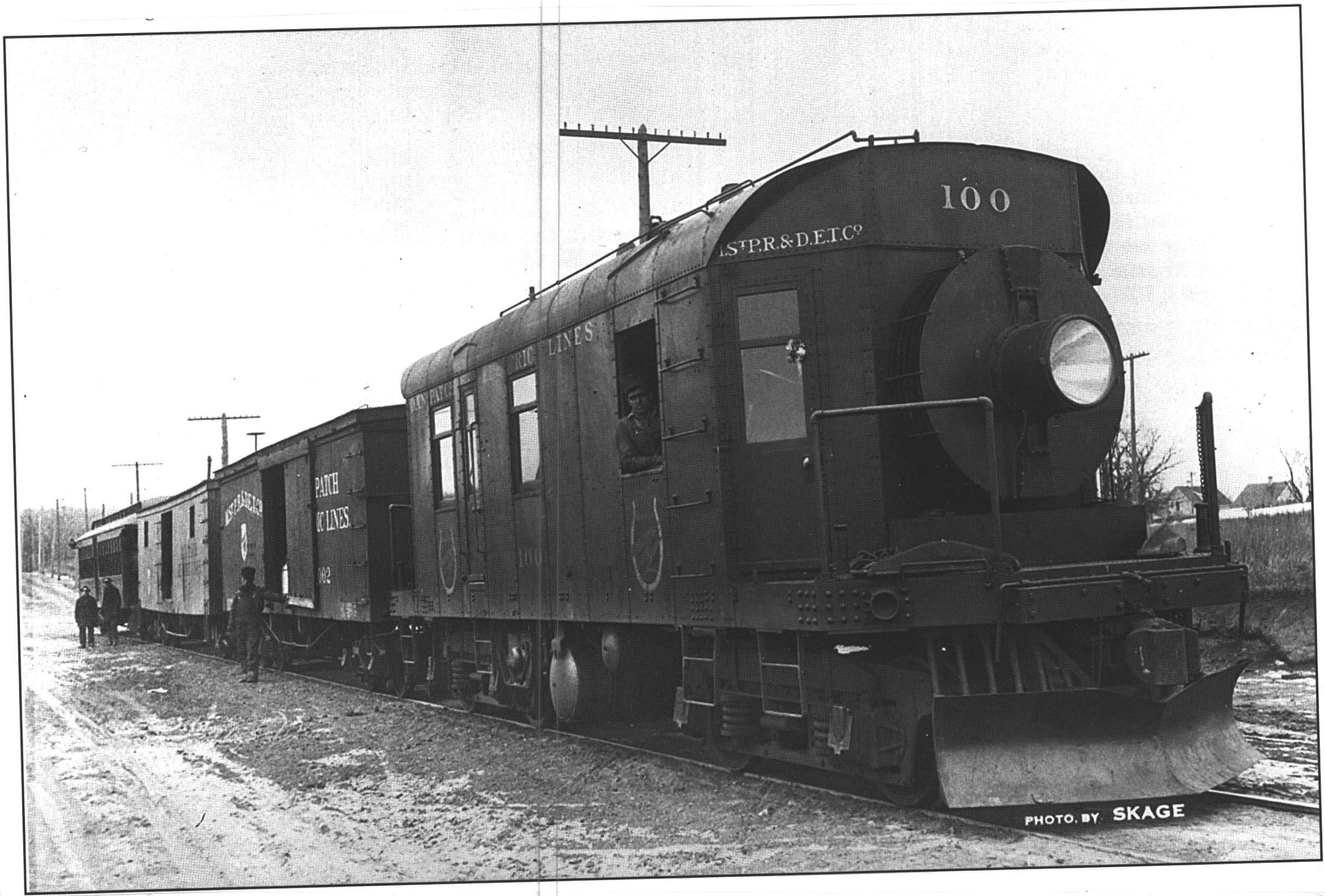
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M.StP.R.&D.E.T.Co
DAN PATCH ELECTRIC LINES
PATCH
IC LINES
PHOTO. BY SKAGE

Now here's a pair of old photos with definite provenance; a fellow named **Raymond S. Zeitler**, who came up with an unsuccessful line of boxcabs and motor cars from his **Zeitler Gas Car & Locomotive Company**, wrote an instructional (and probably self-serving) book ca. 1921 entitled "**Self-Contained Railway Motor Cars and Locomotives**". In it, he included a short section about General Electric's Dan Patch locomotive (which I have transcribed and posted here).

General Electric Locomotive. The gas-electric locomotive illustrated in Figs. 74 and 75 [101 exterior and interior] was built by the General Electric Company, Schenectady, New York, and is used by the Minneapolis, St. Paul, Rochester and Dubuque Electric Traction Company, operating what is popularly known as the "Dan Patch" electric line, which is said to be the first railroad operating entirely with an internal-combustion engine service. This 60-ton locomotive is double ended, being built with the box type of cab extending nearly the entire length of the underframe and having all the weight on the drivers. The wheels are 33 inches in diameter, each truck being equipped with 100-horsepower motors. The truck clearances allow for a 100-foot minimum radius of track curvature.

Power Plant. The power plant consists of two 135-kilowatt generating plants similar to the ones used in the gas-electric motor car *{apparently described earlier in the work}* and one engineer is required for its operation. Each of the two gas-electric generating plants is composed of a 175-horsepower, 550-rpm., eight-cylinder four-cycle gasoline engine of the V type direct connected to a 660-volt commutating-pole, compound-wound electric generator, with an outboard bearing supported by brackets bolted to the magnet frame. The cylinders have an 8-inch bore and a 10-inch stroke. Ignition is by a low-tension magneto. The engines are started by compressed air in the same way as on the gas-electric cars, with the additional feature that after the first one is running the second may be started electrically from it. The control is arranged so that one or both generating sets may be used to operate the locomotive from either end in accordance with the trailing load. Compressed air for starting is taken from the main reservoirs of the air-brake system, these being built with a surplus capacity. Two single-cylinder air compressors which are driven from the crankshafts of the main engines have a displacement of 22½ cubic feet of free air per minute at the rated speeds and are fitted with automatic governors to maintain a constant pressure. The engines can rotate at normal speed irrespective of the speed of the locomotive and can deliver their maximum power at all times, a feature of advantage on grades, in case of storm, or under other emergency conditions involving sudden heavy current demands.

Auxiliary Power Plant. The locomotive is provided with an auxiliary gas-electric set to furnish power for lighting the cab, headlights, and trailers and for pumping an initial charge of air to fill the reservoirs and start the engines. This set is started by hand and consists of a vertical four-cylinder four-cycle 750-r.p.m. gasoline engine which is direct connected to a 5-kilowatt 65-volt commutating pole compound wound electric generator. The cylinders have a 3-inch bore with a 6-inch stroke, and ignition is by a high-tension magneto. The air compressor on the 65-volt circuit is of the two-cylinder railway type and has a displacement of 25 cubic feet per minute against a tank pressure of 90 pounds per square inch. Air for all the compressors is taken from the cab interior through screens and delivered to the three reservoirs, each 18 inches by 87½ inches, which are installed at one side of the cab in the center and are connected in series, thereby affording an opportunity for the radiation of heat and the condensation of moisture before the air enters the air-brake cylinders. After starting the main engines, the governor cuts out the motor-driven set and all air is supplied by the air compressors on the main engines.

Tractive Effort. Mounted on the axles with nose suspension are four General Electric 205D 600-volt commutating-pole series-wound box-frame railway motors, having an hourly rating of 100 horsepower each. All four axles are, therefore, driving axles. The gear ration is 17:58 (a reduction of 3.41), which ratio is especially adapted for freight and switching service as it affords a maximum tractive effort for starting and at low speeds. the motors are ventilated by a special vacuum system operated in conjunction with the engines. The performance of the locomotive is approximately such that a tractive effort of 16,000 pounds is provided at 5 m.p.h. and 3500 pounds at 30 m.p.h.

Control of Motor Equipment. The control of the motor equipment is similar to that of the standard gas-electric motor car, with the cab installed at each end. The motors, however, are connected permanently in pairs in parallel, and the two pairs, operating like single motors, are placed progressively in series and in parallel. The controller provides seven running steps in series and six in parallel without rheostats in the main circuit. There are two additional points for shunting the fields, making a total of fifteen running points.

To produce smooth and rapid acceleration, the speed changes are made by governing the voltage through varying the strength of the generator fields, this being accomplished by movement of one handle on the controller. Separate handles are provided for throttling the engine and reversing the motors. The latter operation is accomplished by changing the motor connections in the usual manner and without stopping the engines, which always rotate in the same direction. This, in an emergency, allows the train to be brought quickly to a stop independently of the brakes.

Construction Data. A 300-gallon gasoline tank fitted with cap and filler is installed beneath the underframing of the locomotive. The radiators are of the fin type and are mounted on each section of the cab roof, the water being circulated by the thermo-siphon system. There is also a radiator draining system, the tanks being situated at one side in the central section of the cab; and a suction type of ventilator is mounted in the roof between the radiators.

The principal data and dimensions are as follows:

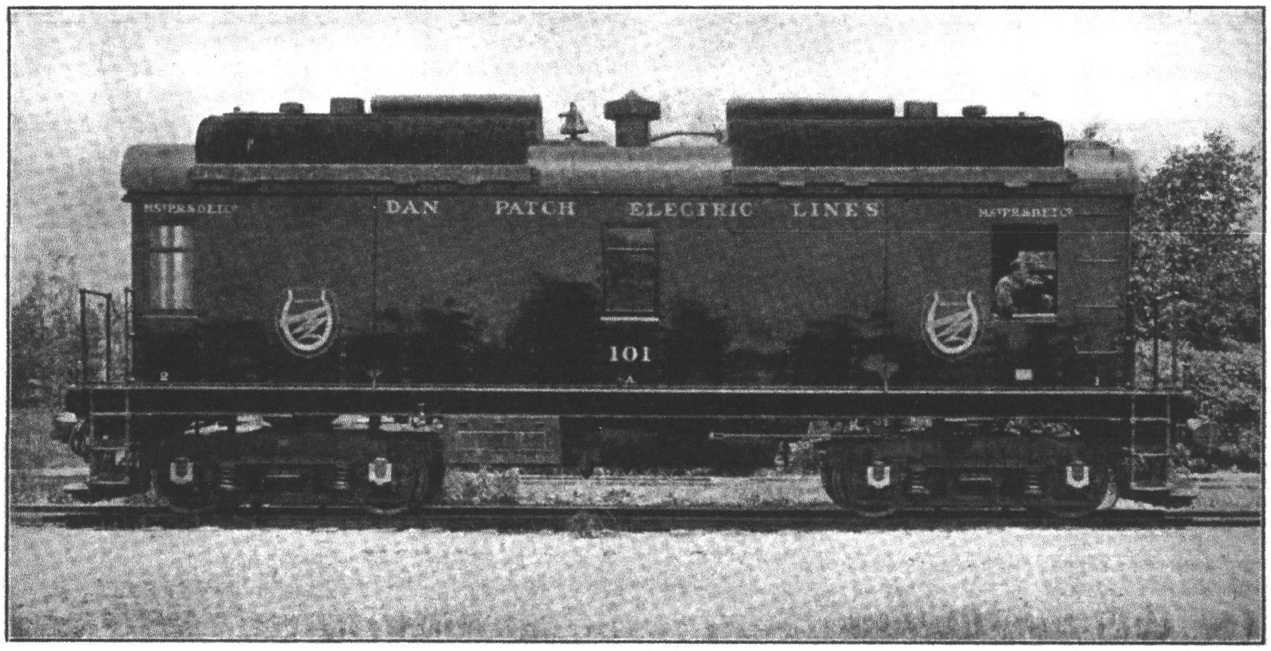
Total net weight	120000 pounds
Weight, per axle	30000 pounds
Maximum tractive effort	32200 pounds
Length between coupler faces	42 feet 4 inches
Length over cab	34 feet
Height over all	14 feet 10¾ inches
Width over all	10 feet 2 inches
Total wheel base	24 feet
Rigid wheel base	6 feet 10 inches

===*===

Gas-Electric Locomotives for Dan Patch Line

This Railway, Which Is the First to Have Been Operated Throughout with Gas-Electric Equipment, Has Recently Placed in Service Three 60-Ton Locomotives, the Largest Machines of the Type Ever Built

The Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company, operating what is popularly know as the "Dan Patch" electric line, has recently placed in commission three 60-ton gas-electric locomotives for freight, passenger and terminal service, these being the largest machines of the type ever built. They are somewhat similar in design although more powerful than the 57-ton gas-electric locomotive which has been in successful operation for the past year on the company's lines from Minneapolis to Mankato, Minn., and the four gas-electric locomotives, together with the thirteen gas-electric motor cars which the railway has purchased to date, constitute a complete equipment for mixed traffic which is unique in the history of interurban railroading. The Dan Patch line, in fact, is said to be the first railroad in the world to have been operated entirely with gas-electric service.



"DAN PATCH" LINE LOCOMOTIVES—GENERAL VIEW OF 60-TON GAS-ELECTRIC LOCOMOTIVE

CHARACTERISTICS OF LINE AND TRAFFIC

The line extends south from the company's terminal building in Seventh Street, Minneapolis, to Mankato, a distance of 107 miles. About midway of the line a branch runs northeast from Northfield to Randolph, 7 miles distant. Another extension is contemplated from Fairibault southeast to Albert Lea, Dodge Center, Rochester and beyond, having Dubuque, Iowa, as its objective terminal point. The fine rolling section of Minnesota thus traversed, with productive grain fields, dairy and truck farms, and numerous thriving towns and cities of varied industrial activity, is one of the most prosperous in the State. The territory presents few difficulties in road construction, the severest grade on the present line being 2 per cent.

The roadway was built and improvements are being constructed with a view to permanent stability, reinforced concrete being frequently used in the work. Substantial stations, similar to those used by steam railroads, are located at the various cities and towns along the route, and smaller stations have been erected every few miles at rural stops to afford protection to the traveling public from inclement weather.

About 25 miles south of Minneapolis, at Orchard Gardens station, several thousand acres of farm land have been divided into 5-acre and 10-acre tracts by the company, and these are being sold to residents of Minneapolis and St. Paul, many of whom have erected houses and travel to and from their places of business in the city each day on the railway. There are also many attractive lakes along the route, affording excellent facilities for boating, bathing and fishing, and bringing thousands of city dwellers out into the open country during the summer months. Antlers Park, a summer resort and recreation park 30 miles south of Minneapolis, is owned and operated by the traction company.

Four through trains daily each way, one of which is a limited parlor-car train, constitute the normal passenger schedule of the road. The limited train makes the run of 107 miles, including four stops, in three hours and twenty-five minutes, while the other trains require four hours and five minutes for the trip. This service is supplemented by local trains between certain points of the line and the terminals, and by excursion trains during the summer season as occasion requires. One 70-ft. gas-electric motor car, seating eighty-nine passengers, normally makes the run. When travel is somewhat heavy a trailer is added, and for excursions and extra heavy traffic a train is made up of trail cars drawn by a gas-electric locomotive.

LOCOMOTIVE POWER PLANTS

The new 60-ton locomotives are double ended, being built with the box type of cab extending nearly the en-

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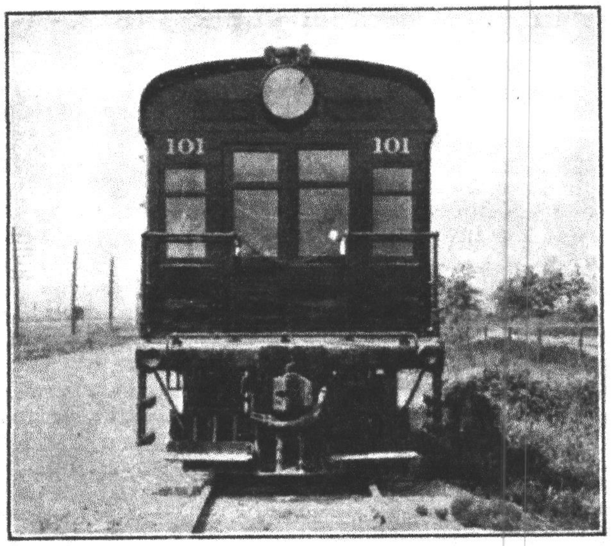
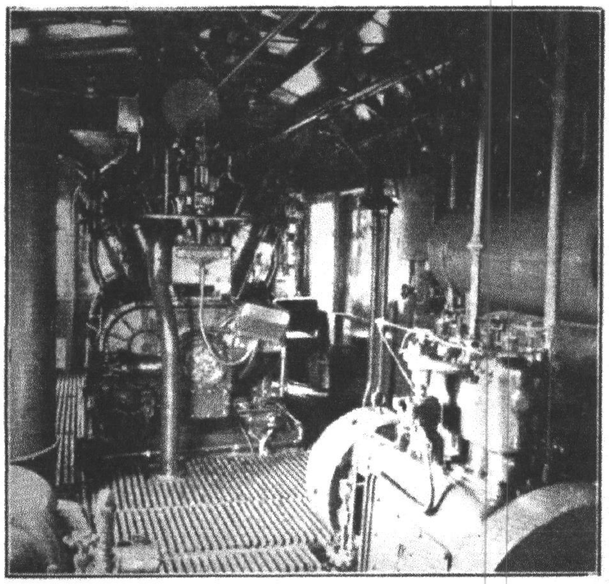


"DAN PATCH" LINE LOCOMOTIVES—END VIEW

tire length of the underframe and having all the weight on drivers. The wheels are 33 in. in diameter, and each locomotive is equipped with four 100-hp. motors. The truck clearances allow for 100 ft. minimum radius of curvature. The power plant consists of two 135-kw. generating sets similar to the one used in the gas-electric motor cars, only one engineer being required for its operation. The locomotives were designed and constructed complete by the General Electric Company.

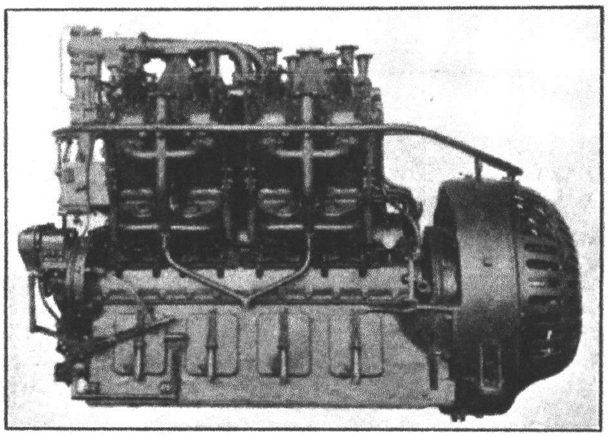
Each of the two gas-electric generating sets for the power plant equipment is composed of a 175-hp., 550-r.p.m., eight-cylinder, 4-cycle gasoline engine of the "V" type, which is direct-connected to a 600-volt, commutating-pole, compound-wound electric generator with an outboard bearing supported by brackets bolted to the magnet frame. The cylinders are 8-in. bore and 10-in. stroke. Ignition is accomplished with low-tension magnetos and the sets are started by air pressure, in the same way as in the gas-electric motor cars, with the additional feature that after one set is running, the second may be started electrically from the first. The control is so arranged that either one or both of the generating units may be used to operate the locomotive from either end, in accordance with the needs of the trailing train load. Compressed air for starting is taken from the main reservoirs of the air-brake system, these being built with surplus capacity. The two main single-cylinder air compressors which are driven from the crankshafts of the main engines have a displacement of 22.5 cu. ft. of free air per minute at the rated speed and are fitted with automatic governors to maintain a constant pressure.



"DAN PATCH" LINE LOCOMOTIVES—INTERIOR OF CAB

Great flexibility of control and economy of operation result through electrical transmission of the energy. The engines can rotate at normal speed irrespective of the speed of the locomotive and deliver their maximum power at all times, a feature of great advantage on grades, in case of snow storms, or other emergency conditions involving sudden, heavy current demands.

The locomotive is provided with an auxiliary gas-electric set to furnish power for lighting the cab, headlights and train coaches, and for pumping an initial charge of air to fill the tanks and start the main engines. This set is started by hand. It consists of a vertical, 750 r.p.m., four-cylinder, 4-cycle gasoline engine, which is direct-connected to a 5-kw., 65-volt, commutating-pole, compound-wound, electric generator. The cylinders are 3-in. bore and 6-in. stroke, and ignition is effected by a high-tension magneto. The air compressor on the 65-volt circuit is of the two-cylinder, motor-driven railway type, and has a piston displacement of 25 cu. ft. per minute when pumping against a tank pressure of 90 lb. per square inch.



"DAN PATCH" LINE LOCOMOTIVES—OPERATING SIDE OF EIGHT-CYLINDER, GAS-ELECTRIC GENERATING UNIT

Air for all compressors is taken from the cab interior through screens and is delivered to the three reservoirs, each 87½ in. x 18 in., installed at one side of the cab in the center and connected in series, thereby affording an opportunity for radiation of heat and condensation of moisture before entering the brake cylinders. After starting the main engines, the governor cuts out the motor-driven set, and all air is supplied by the air compressors on the main engines.

MOTORS AND CONTROL

Mounted on the axles with nose suspension are four GE-205-D, 600-volt, series-wound, commutating-pole, box frame, railway motors having an hourly rating of 100 hp. each. All four axles are therefore driving axles. The gear ratio is 17 : 58, a reduction of 3.41, which is especially adapted for freight and terminal switching service, as it affords maximum tractive effort for starts and for low speeds. The motors are ventilated by a special vacuum system operated in conjunction with the engines. The performance of the locomotive is approxi-

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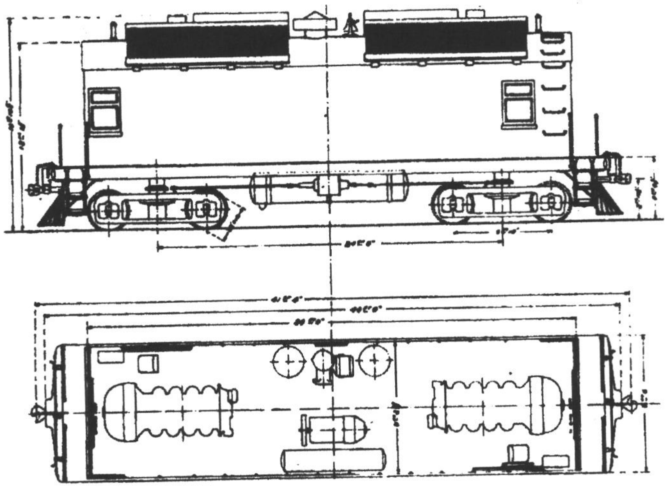
mately such that a tractive effort of 16,000 lb. is provided at 5 m.p.h. and 3500 lb. at 30 m.p.h.

The control of the motor equipments is similar to that of standard gas-electric motor cars, a type P-53 controller being installed in each end of the cab. The motors are, however, connected permanently in pairs in parallel, and the two pairs, operated like single motors, are placed progressively in series and parallel. The controller provides seven running steps in series and six in parallel, without rheostats in the main circuit. There are also two additional points for shunting the series fields, making a total of fifteen efficient running points.

Inasmuch as electrical energy is transmitted directly, there are no losses through the intervention of mechanical change-speed gearing. To produce smooth and rapid acceleration, the speed changes of the motors are effected by governing the voltage through varying the strength of the generator fields, this being accomplished by the movement of one handle on the controller. Separate handles are provided for throttling the engine and for reversing the motors. The latter operation is accomplished by changing the motor connections in the usual manner and without stopping the engines, which always rotate in the same direction. This, in an emergency, allows the train to be brought quickly to a halt independent of the brakes.

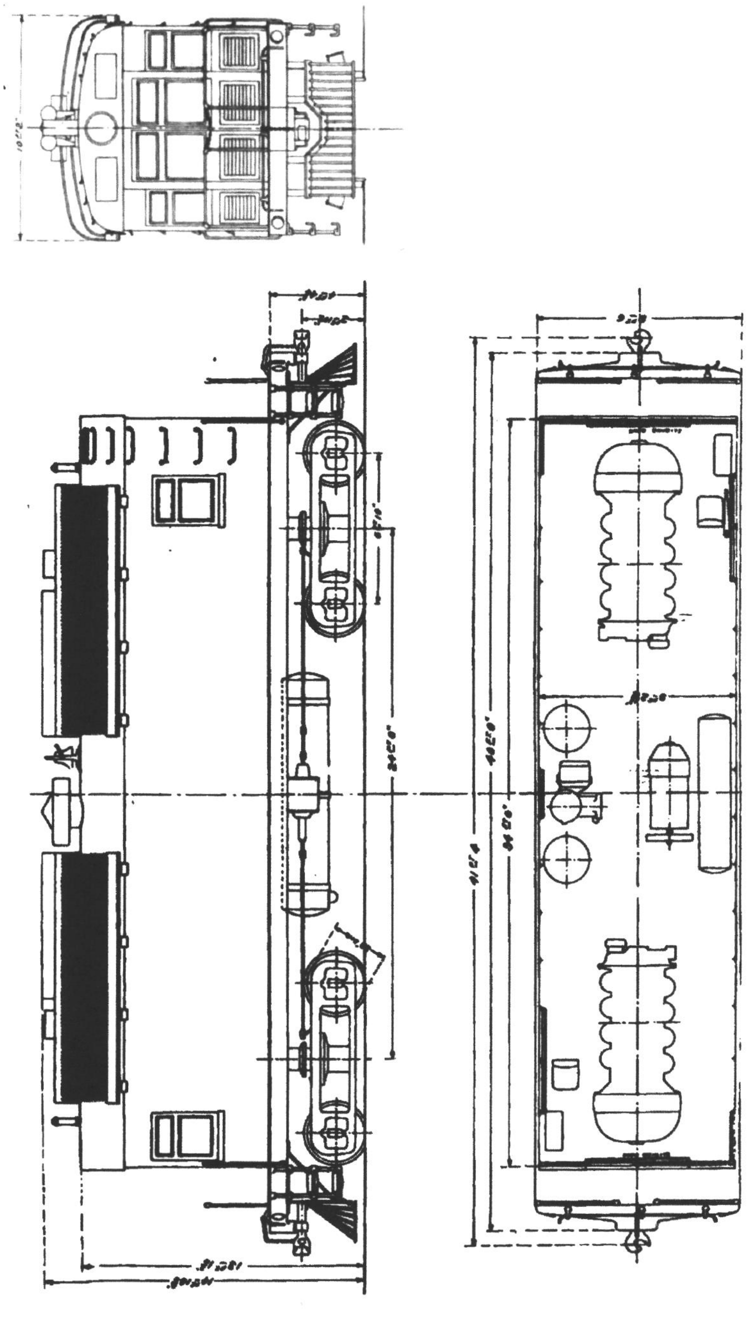


"DAN PATCH" LINE LOCOMOTIVES—DIMENSION OUTLINE

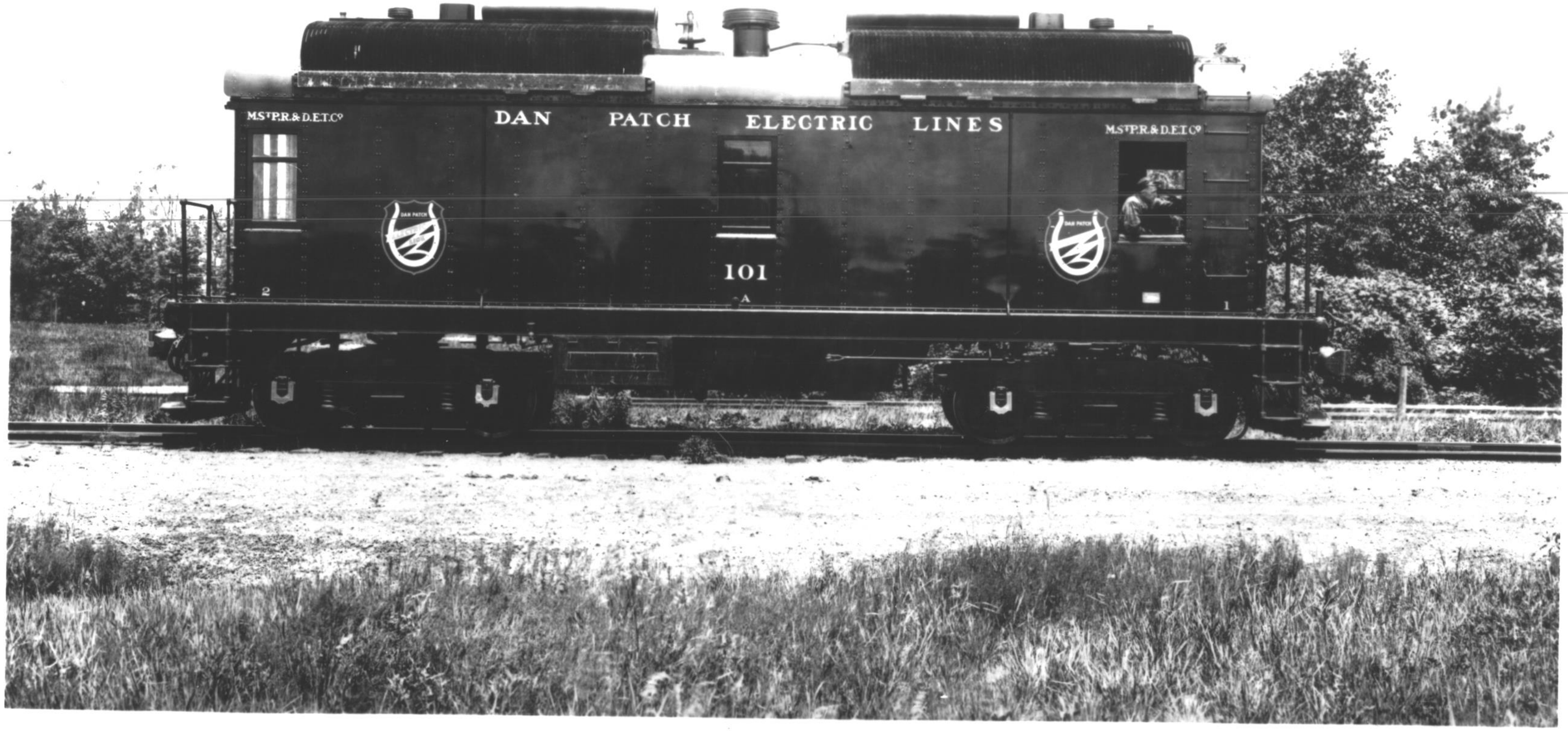
A 300-gal. gasoline storage tank, fitted with filler and filter, is installed underneath the underframing of the locomotive. The radiators are the fin-tube type and are mounted on each end-section of the cab roof, the cooling water being circulated by the thermo-syphon system. There is also a radiator draining system, the tanks being situated at one side in the central section of the cab, and a suction type ventilator is mounted in the roof between the radiators.

The principal data and dimensions applying to the locomotives are as follows:

Total net weight	120,000 lb.
Weight per axle	30,000 lb.
Maximum tractive effort	32,200 lb.
Length between knuckle faces of couplers	42 ft. 4 in.
Length over cab	34 ft.
Height over all	14 ft. 10¾ in.
Width over all	10 ft. 2 in.
Total wheelbase	24 ft.
Rigid wheelbase	6 ft. 10 in.



General Arrangement of the Gas-Electric Locomotive for Use on the Dan Patch Electric Lines


M.St.P.R.&D.E.T.Co
DAN PATCH ELECTRIC LINES
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PUBLICATION BUREAU

340662 TYPE 404-G-120-4GE205D GAS ELECTRIC LOCOMOTIVE BUILT FOR THE MINNEAPOLIS. ST. PAUL. ROCHESTER AND DUBUQUE ELECTRIC TRACTION COMPANY BY THE GENERAL ELECTRIC COMPANY.

INDEX E-318.34

11-1915

motors may be hung outside being to make it possible to place the battery cells on the truck, the trays in such a construction resting on angle crossings inside the wheels. There are two motors to each truck, the type of motors used in these cars having a combined maximum capacity of twenty-four horsepower. The 7-ft. 6-in. wheelbase gives the car capacity for taking curves as sharp as 35 ft. radius, an advantage for operation in a small city.

GAS-ELECTRIC LOCOMOTIVES FOR DAN PATCH LINES

ALL-STEEL CONSTRUCTION

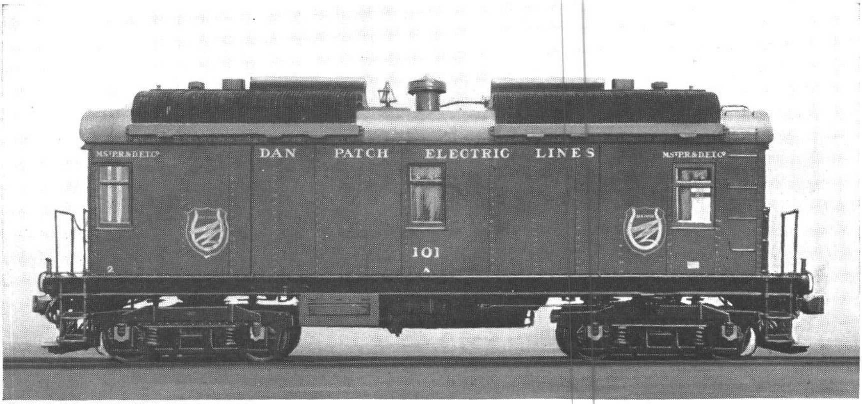
THREE 60-ton gas-electric locomotives, the largest of the type ever constructed, recently have been placed in commission for freight, terminal and passenger service on the system of the Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company, popularly called the Dan Patch Lines. Although more powerful, these locomotives follow closely the design of the 57-ton gas-electric locomotive which has been in successful operation on the system for more than a year, running between Minneapolis and Mankato, Minn., a distance of 107 miles. These four locomotives, with the thirteen gas-electric motor cars which the company has installed to date and with other equipment which includes trailer and freight cars, constitute a complete equipment which is unique on interurban lines, the Dan Patch having been the first railroad in the world to be operated entirely with gas-electric motive power.

The locomotives are General Electric machines, the bodies and trucks being built by the Wason Manufacturing Company, of Springfield, Mass. Their installation follows the completion and delivery of forty-five freight cars and twelve trail cars by The Brill Company and of two gas-electric motor cars by the Wason Manufacturing Company, all of which equipment was described in the July issue of BRILL MAGAZINE.

On lines where the traffic is not of such nature as to call for car or train operation at frequent intervals, resulting in a large number of car miles per mile of track, and where the investment necessary for overhead construction and maintenance of "ready to run" power held always in contact with the units of the system is relatively high, the gas-electric units have found their place because of their reduction of this "ready to run" cost and the consequent increase of the true running expense. Although the trolley system is well adapted for the operation of all urban, suburban and interurban lines where cars are run under short headway and the car miles per mile of track reach a high figure, the equipment made up of self-contained units is the one that is selected to handle economically infrequent and irregular schedules, effecting a saving because of the power plant being in operation only when the units are gathering revenue. On such gas-electric lines as the Dan Patch the motor cars are used for the ordinary runs, and since the seating capacity of the average car is high—from 65 to 100—they take care of the ordinary traffic very well. Also, the capacity of the motor cars may be augmented by giving them a trailer car, thus taking care of traffic which is somewhat heavy. However, the gas-electric locomotives, with their greater power, are well suited for excursion trains, where several trailers are used, and for extra heavy traffic of all sorts. Also, they have been proved economic of operation in freight service, their potential tractive effort being so high as to make possible the hauling of very heavy loads—and therefore the bringing in of large revenue—for a uniform operating cost.

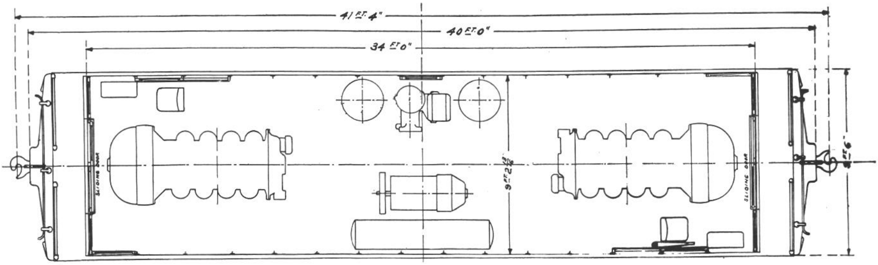
The new locomotives are built with the box type of cab extending almost the full length of the underframe, which is built for unusually heavy service, four longitudinal 10-in. 30-lb. channels being used, two for the outside and two for the center sills. These sills extend the entire length of the frame and are tied together by heavy end frame steel bumpers and bolster plates, each channel being riveted to the webs of the end frame castings and bolted to the top and bottom bolster plates. The bolsters are built up of 12 by 1⅛-in. steel plates, the bottom bolster being carried across the frame and riveted to all four longitudinal sills. The steel center plate castings are bolted to the bolster plates, and cross sills are riveted in where they are needed to support equipment which is hung below the frame.

The power for the locomotives is obtained from two gas-electric generating sets, 175-hp., 4-cycle gasoline engines being direct-connected to 600-volt, commutating-pole, com-



Dan Patch Locomotives. These locomotives are the largest machines of the type ever built. They have a maximum tractive effort of 32,200 lb.

pound-wound, electric generators. The sets are started with air pressure, in the same way as in the gas-electric motor cars, but with the additional feature that when one set is running the other set may be started electrically from the first. The control is so arranged that either one or both of the generating units—depending upon the trailer load—may be used to operate the locomotives from either end. Flexibility of control and economic operation, it is claimed, result from electrical transmission of energy, the engines being able to rotate at normal speed no matter what the speed of the locomotive. Thus they deliver their maximum power at all times, which is advantageous where emergencies arise to create heavy current demands.

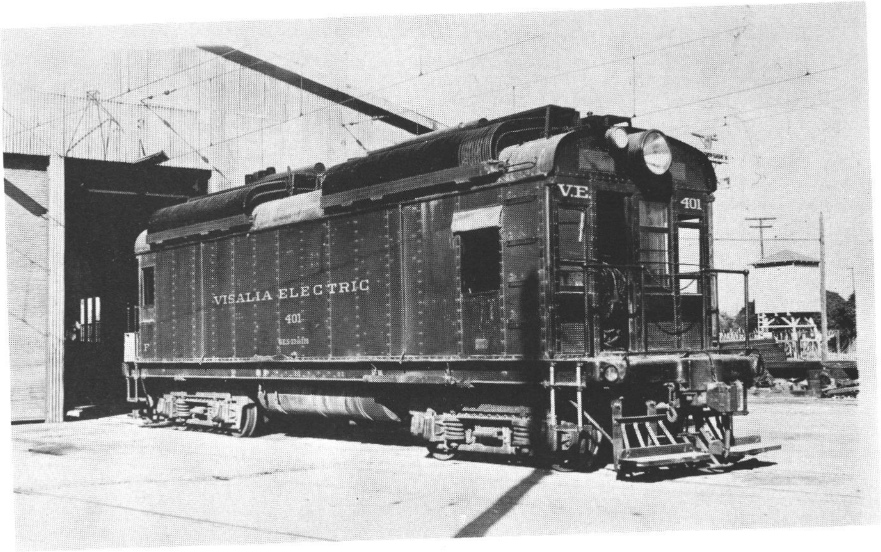


Dan Patch Locomotives. The machines, fully equipped, weigh 120,000 lb. The height over all is 14 ft. 10¾ in.; width over all, 10 ft. 2 in.; centers of bolsters, 24 ft.; wheelbase, 6 ft. 10 in.; minimum curve radius negotiable, 100 ft.

The motors are connected permanently in pairs in parallel and the pairs, operated like single motors, are placed progressively in series and parallel. The speed changes of the motors are effected by governing the voltage through varying the strength of the generating fields, which is accomplished by the movement of one handle on the controller. The motors are reversed in the usual manner without stopping the engines, which always rotate in the same direction. This, in an emergency, allows the train to be brought to a stop quickly and independent of the brakes. The maximum tractive effort of the locomotives is 32,200 lb., the performance of the machines showing a tractive effort of 16,000 lb. at a speed of five miles per hour, 3,500 lb. at 30 miles per hour and 1,000 lb. at 50 miles per hour. The locomotives are driven by four 600-volt, 100-hp. motors, thus making each axle a driver.

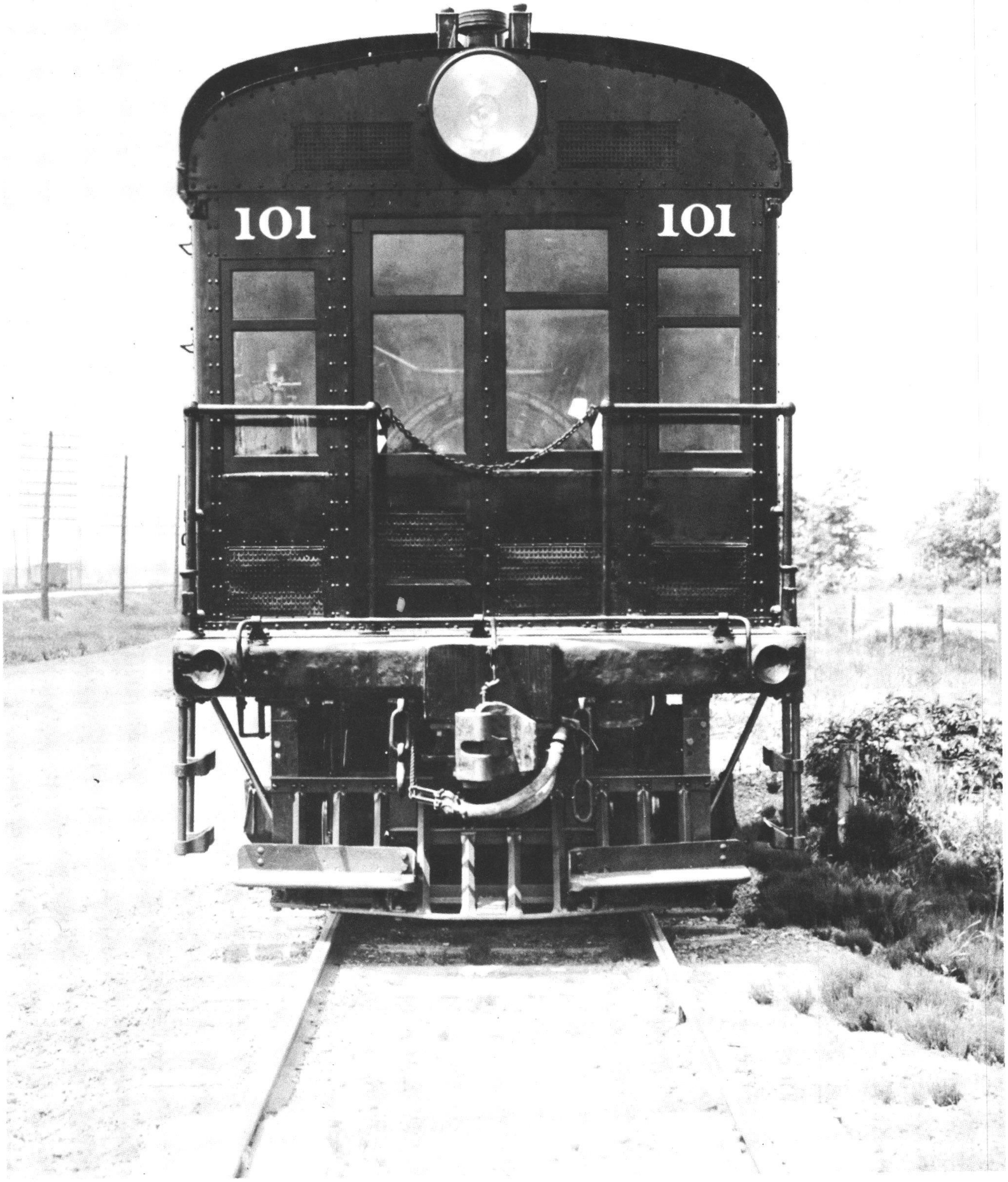
The locomotives are arranged to be operated at both ends. The generating sets and controllers are installed in each end of the cab, with the auxiliary lighting set, air compressor and storage tanks grouped in the central section. For making easy the installation of these generating sets and other equipment, the ends of the cab are constructed so that they may be removed.

In the upperframe of the car the side posts and rafters are of "T" iron and angles covered with steel plates having lap and butt joints.


V.E.
401
VISALIA ELECTRIC
401

Visalia Electric freight gas-electric 401 at Exeter.—Ira Swett.

EP101



After the success of the first internal combustion engine powered locomotive in the U.S. in 1913 (Dan Patch #100), General Electric followed up with #101 for the Dan Patch Line in 1915. This photo shows the operator seated in the cab beside the main generator with no bulkhead separating the engine compartment from the operator's cab. Double doors were to provide access to the machinery.

R.F. Corley Collection

1501 - 1502

Gas electric locomotives II 1501 and 1502 were 1915 products of General Electric Company. 1501 was used by Dan Patch Lines, Minnesota, for a year before coming to PE; 1502 was also a Dan Patch locomotive, but went to Visalia Electric Railway until 1918, when it also was purchased by PE. PE used both gas electrics in the Long Beach area to switch docks which could not have trolley wire due to hazardous interference with cranes. Visalia Electric also had a third locomotive of this type which it operated throughout World War II. 1502 was 402 on VE.

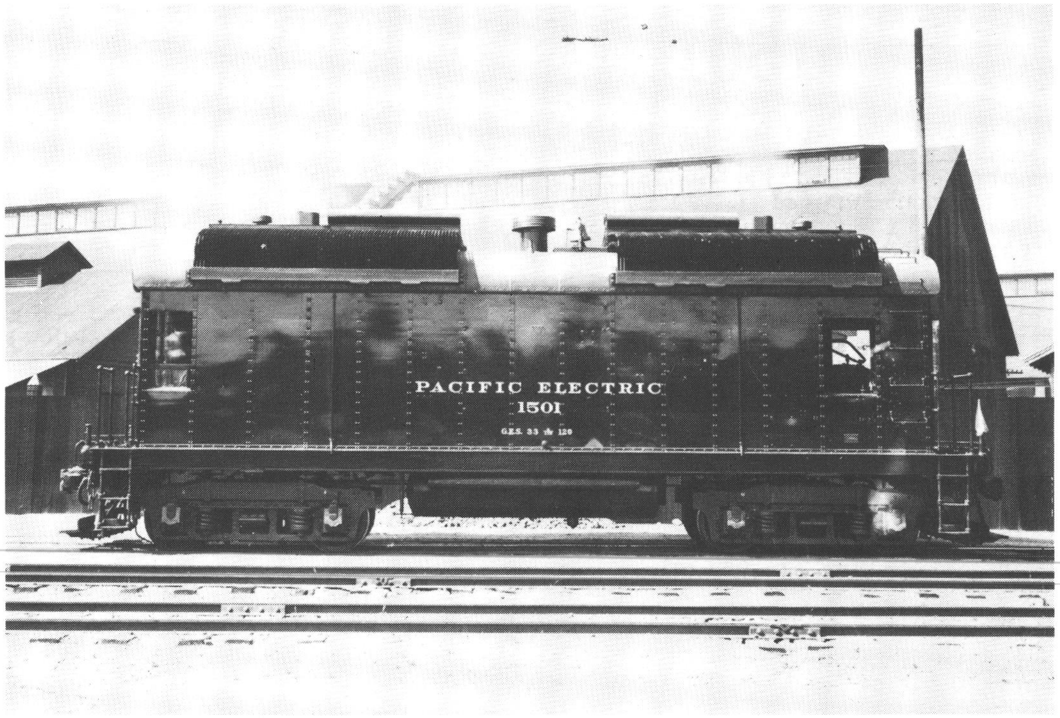
PE had many headaches with these engines. In 1935 PE considered replacing them with steam switchers, stating then "in cases where these two locomotives are disabled or withheld from service for repairs, we have been required to use a Southern Pacific steam locomotive for switching the Long Beach district west of the flood control channel. These two gas electrics are fast becoming obsolete and before a great while will require excessive maintenance expense to continue them in service; ultimately we will have to perform the Long Beach switching work with a steam locomotive."
(---Letter from Mr. Squires to President O. A. Smith, 6-11-35)

By 1939 the gas electrics were a major problem, as witness this letter from President Smith to President L. B. McDonald of SP: "The two gas electric engines of PE assigned to service at Long Beach are not rendering a satisfactory service and are the cause of complaints from shippers. It is essential that this switching service be protected and if PE can obtain an additional switch engine of the 1100 Class it would not only take care of the situation with regard to rendering a satisfactory switching service but will also make it possible to effect a substantial saving in operating expenses."

A more explicit description of the problem at Long Beach was contained in a letter dated March 28, 1939 from Mr. Squires to President Smith:

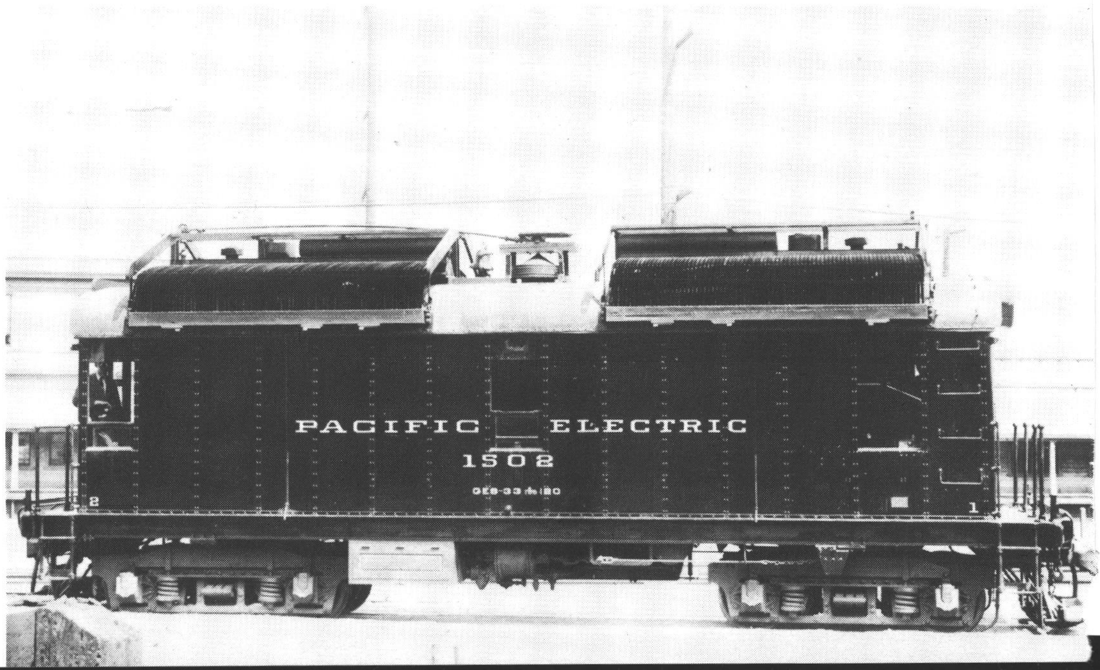
"During the period just past we have made a thorough endeavor to use the gas electrics at Long Beach; the result, to say the least, has been discouraging. We understand Mr. Knoche has spoken to you about the definite unfavorable reaction on the part of the harbor authorities in Long Beach because of the repeated breakdowns of these gas electrics. The authorities have practically barred these engines from service on the dock and we have been securing SP engines through the Harbor Belt Line. The incident on March 10 is illustrative:

"At 12:15 PM the 1501 broke down when switching at the docks and the standby engine could not be gotten into service until 1:20 PM. The breakdown occurred just as the 1501 had pulled the dock tracks and was ready to respot loads and then the stevedoring company's men and equipment were idle on pay and both they and the steamship line registered strong

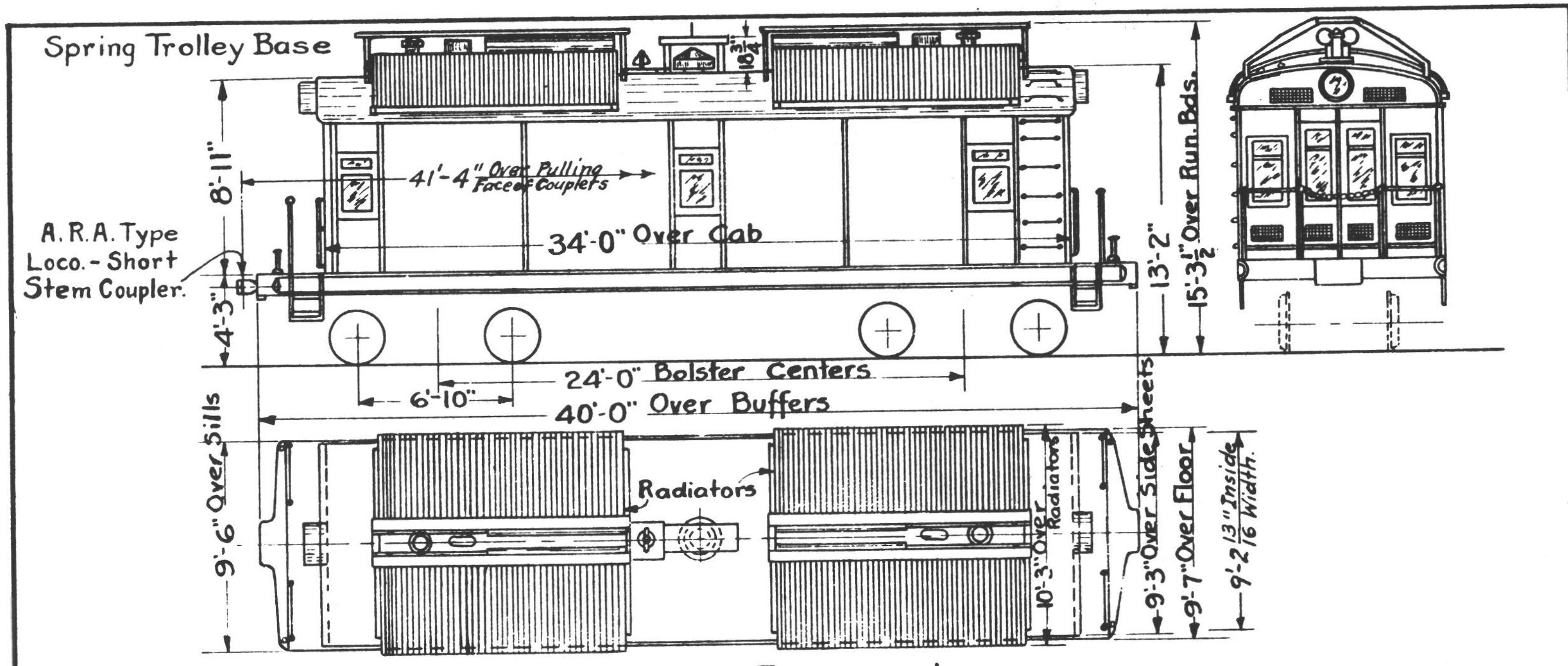


Above: Gas electric 1501 at 7th & Alameda, L.A., in 1916. (MC)

Below: Twin 1502 at San Pedro in 1918; no explanation is offered for the unique type of lettering. Trolley operated signals, wigwags. (MC)



1501 & 1502.
2 Loco's.


Spring Trolley Base
10¾"
8'-11"
41'-4" Over Pulling Faces of Couplers
34'-0" Over Cab
A.R.A. Type Loco.- Short Stem Coupler.
4'-3"
13'-2"
15'-3½" Over Run. Bds.
24'-0" Bolster Centers
6'-10"
40'-0" Over Buffers
9'-6" Over Sills
Radiators
10'-3" Over Radiators
9'-3" Over Side Sheets
9'-7" Over Floor
9'-2 13/16" Inside Width.

GASOLINE ELECTRIC LOCOMOTIVE.

Type - G.E.S.-33 $\frac{4}{110}$ - 120	Gasoline Electric.
Total Weight	125,760 lbs.
Motors	4 G.E. 205-D - 110 H.P.
Gear Ratio	17:58
Controllers	Two G.E. Type P-53A
Type Trucks	Two G.E. Type RM54B
Size Journals	5½" x 10" A.R.A.
Wheels	34" Rolled Steel, 840 lb.
Type Hand Brake	Blackall
Air Brake	West. Auto. & Strt. Air.
Compressor	One G.E. Type CP28C - 60 Volts
Size Cylinder	16" Diameter
Braking Power	100 %

Note - Applied, Series Parallel Switch, shop made.

Headlight - Two Incan. 65 Watt.

Max. Tractive Effort - 32,200 lbs.

Governor - G.E. Type MH, Form A.
Brake Valves - Two West. Type G-6 & Two Christensen.

GENERATING EQUIPMENT

Two - Type G.M. 16 Form C-5, 550 R.P.M., 175 H.P. Gas. Engines coupled to -

Two Continuous Current Type T.D. Form "A" 600 Volt Generators.

One - Auxiliary Engine, Type G.M. 23 Form B.4.8 - 10 H.P. - 4 Stroke Cycle. Coupled to -

One - Type M.P. 6 Form "E" 750 R.P.M. 65 Volt Continuous Current Generator.

AUX. ENG. STARTER EQUIPMENT

One Leece-Neville Elec. Starter, 6-8 Volt, Type 360-M.
One Exide 6-8 Volt Battery Type 3-LXRE-13-1.

Built by General Electric Co. in 1915.
Nº 1501 purchased in 1916 from Dan Patch Lines.
Nº 1502 purchased in 1918 from Visalia Electric Co.

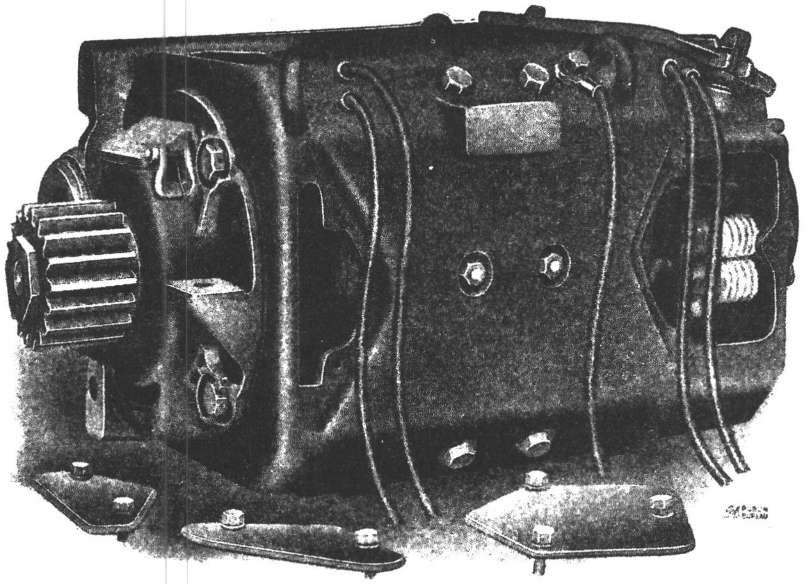


Fig. 1647—Front View of G. E.-205 Commutating Pole, Box Frame Motor

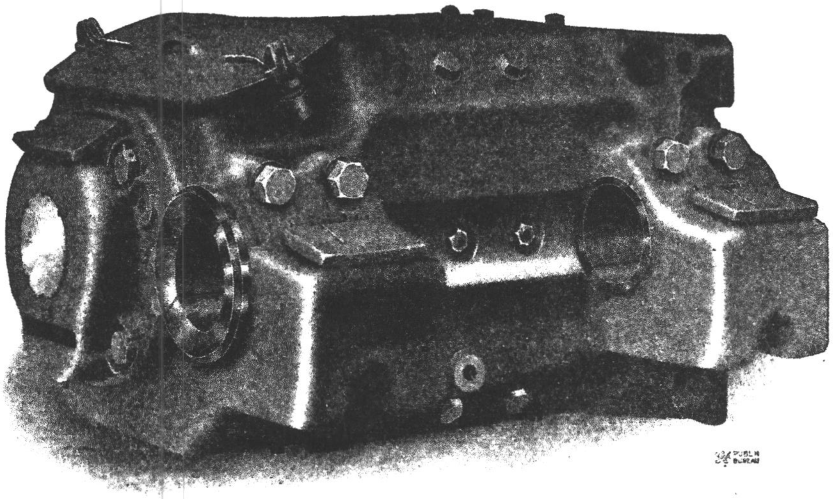


Fig. 1648—Rear View of G. E.-205 Commutating Pole, Box Frame Motor

PASSENGER TRAILERS

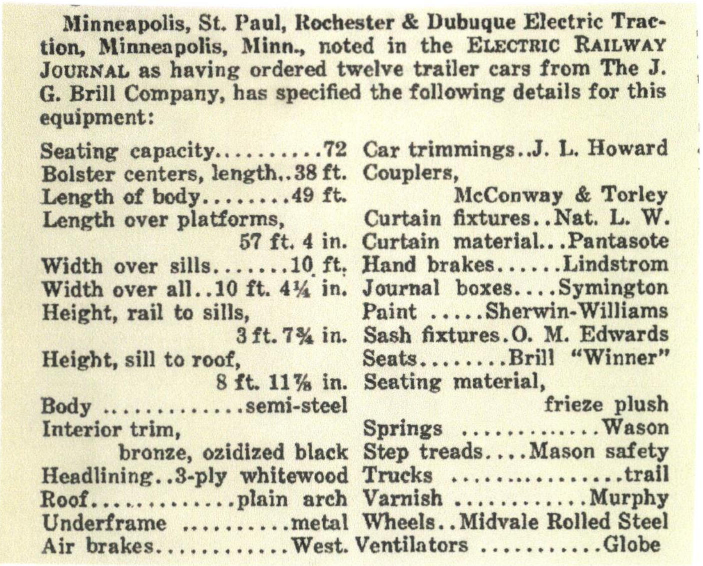
Numbers	Builder	Order No.	Received	Notes
50-53				(1)
54-55	Wason Mfg. Co.	12335	6-12	(2)
56-59	Wason Mfg. Co.	13500	4-13	(2)
60-62	Wason Mfg. Co.	13500	5-13	(2)
63-68	J. G. Brill Co.	19602	6-15	(3)
69-74	J. G. Brill Co.	19602	7-15	(3)

(1) The Electric Railway Journal listed the MStPR&DETCo. as ordering four passenger trailers 44 ft. long from the J. G. Brill Co. in 1910. However photographs indicate that these four cars were former New York elevated railway cars. Wood construction, railroad roof, center door, open platforms.

(2) Steel construction, open platforms, 48'6" long, weight 22 tons. Seated 104 persons, three per seat.

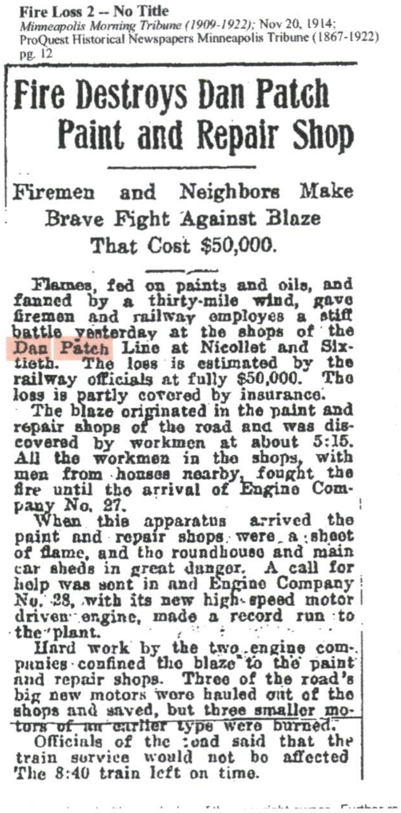
(3) Steel construction, open platforms, 57'4" long overall, 49'0" long body, 4'2" long platforms, 10'0" wide. One toilet room. Wason Mfg. Co. trucks identical to those on the rear end of the passenger motor cars

Electric Railway Journal 5-15-1915



Minneapolis, St. Paul, Rochester & Dubuque Electric Traction, Minneapolis, Minn., noted in the ELECTRIC RAILWAY JOURNAL as having ordered twelve trailer cars from The J. G. Brill Company, has specified the following details for this equipment:

Seating capacity	72	Car trimmings	J. L. Howard
Bolster centers, length	38 ft.	Couplers,	McConway & Torley
Length of body	49 ft.	Curtain fixtures	Nat. L. W.
Length over platforms,	57 ft. 4 in.	Curtain material	Pantasote
Width over sills	10 ft.	Hand brakes	Lindstrom
Width over all	10 ft. 4¼ in.	Journal boxes	Symington
Height, rail to sills,	3 ft. 7¾ in.	Paint	Sherwin-Williams
Height, sill to roof,	8 ft. 11⅞ in.	Sash fixtures	O. M. Edwards
Body	semi-steel	Seats	Brill "Winner"
Interior trim,	bronze, ozidized black	Seating material,	frieze plush
Headlining	3-ply whitewood	Springs	Wason
Roof	plain arch	Step treads	Mason safety
Underframe	metal	Trucks	trail
Air brakes	West.	Varnish	Murphy
		Wheels	Midvale Rolled Steel
		Ventilators	Globe



Fire Loss 2 -- No Title
Minneapolis Morning Tribune (1909-1922); Nov 20, 1914;
ProQuest Historical Newspapers Minneapolis Tribune (1867-1922)
pg. 12

Fire Destroys Dan Patch Paint and Repair Shop

Firemen and Neighbors Make Brave Fight Against Blaze That Cost $50,000.

Flames, fed on paints and oils, and fanned by a thirty-mile wind, gave firemen and railway employes a stiff battle yesterday at the shops of the Dan Patch Line at Nicollet and Sixtieth. The loss is estimated by the railway officials at fully $50,000. The loss is partly covered by insurance.

The blaze originated in the paint and repair shops of the road and was discovered by workmen at about 5:15. All the workmen in the shops, with men from houses nearby, fought the fire until the arrival of Engine Company No. 27.

When this apparatus arrived the paint and repair shops were a sheet of flame, and the roundhouse and main car sheds in great danger. A call for help was sent in and Engine Company No. 28, with its new high-speed motor driven engine, made a record run to the plant.

Hard work by the two engine companies confined the blaze to the paint and repair shops. Three of the road's big new motors were hauled out of the shops and saved, but three smaller motors of an earlier type were burned.

Officials of the road said that the train service would not be affected The 8:40 train left on time.

Disposition of the Passenger Trailers

50 unknown; between 7-1-1912 and 6-30-1913.
51-53 unknown; after 6-3-1915.
56 destroyed in the 60th St. Paint Shop fire 11-19-1914.
62 was damaged in the Paint Shop fire 11-19-1914. Rebuilt August 1915 into Baggage-Mail Car 210.

Fifteen trailers: 54,57-58,63-74 were sold between 7-1-1916 and 6-30-1918.

The Nevada Northern Ry. acquired six cars, three (64,65,67) in 1917 and three in 1918. No. 65 was rebuilt by them with a baggage compartment. See separate article on page 13.

The Oklahoma, New Mexico & Pacific Ry. acquired two cars in 1916 and 1917. Their No.6 was owned by the Western Locomotive & Car Co. and leased from them in December, 1916. Their No.7 was wrecked or disposed of in 1918. No.6 was re-sold to the Midland Valley Ry. 4-5-1923 as their No. T-4, entering service 8-2-1923; sold for scrap 1-14-1939.

Midland Valley Ry. purchased two cars of the 63-74 series in November, 1917, becoming their numbers T-1 and T-2. Scrapped in 1939 and 1924 respectively.

As of July, 1918, four trailers remained: 55,59-61. All were sold with the railroad to the MN&S Ry. in August, 1918.

FREIGHT TRAILERS

As of June 30, 1915:

100 Box Cars: 100,1001-1004   American Car & Foundry Co.   Built 1912-1913
1501-1502   Built 1912   45 ft. long
2000-2007,2009-2093
6 Refrigerator Cars: 3000-3005
15 Flat Cars: 502-516   General American Car Co. and Peteler Car Co.
Built 1912   34 ft. long
1 Gondola Car: 101   Built 1911   28 ft. long
1 Baggage-Mail Car: 200 (later reclassified as a Milk Car)
1 Work Car: 400
1 Caboose: 01   30 ft. long

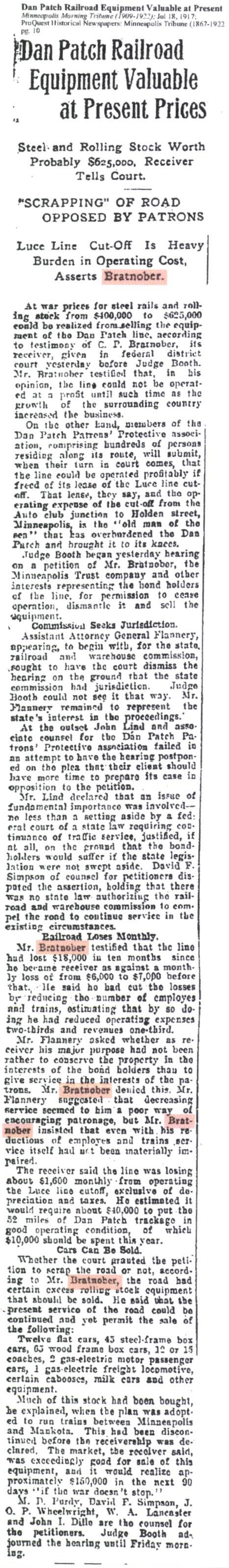
45 Box Cars 2500-2544 J. G. Brill Co. Order 19604 3-1-1915. Wood underframe, 36 ft. long, 40 tons capacity, arch bar trucks.

Disposition of some of the Freight Trailers

One Gondola car, 500, was destroyed in the 60th St. Paint Shop fire, 11-19-1914.

Sold with the railroad to the MN&S Ry. July 1918:
15 Box cars 100,1001,1003,1501-1502, 2502, 2503, 2505, 2509, 2512, 2513, 2521, 2524, 2535, 2542.
2 Baggage/Mail cars 200,210.
15 Flat cars 503-506,509-512,514-516.
1 Gondola car 101
1 Caboose 01

There are two differences with MN&S Ry. records:
Flat Car 510 was used as a Snow Plow. Retired 1919 by the MN&S.
Work Car 400 (Gondola). Retired 1920 by the MN&S Ry.



Dan Patch Railroad Equipment Valuable at Present
Minneapolis Morning Tribune (1909-1922); Jul 18, 1917;
ProQuest Historical Newspapers: Minneapolis Tribune (1867-1922
pg. 10

Dan Patch Railroad Equipment Valuable at Present Prices

Steel and Rolling Stock Worth Probably $625,000, Receiver Tells Court.

"SCRAPPING" OF ROAD OPPOSED BY PATRONS

Luce Line Cut-Off Is Heavy Burden in Operating Cost, Asserts Bratnober.

At war prices for steel rails and rolling stock from $400,000 to $625,000 could be realized from selling the equipment of the Dan Patch line, according to testimony of C. P. Bratnober, its receiver, given in federal district court yesterday before Judge Booth. Mr. Bratnober testified that, in his opinion, the line could not be operated at a profit until such time as the growth of the surrounding country increased the business.

On the other hand, members of the Dan Patch Patrons' Protective association, comprising hundreds of persons residing along its route, will submit, when their turn in court comes, that the line could be operated profitably if freed of its lease of the Luce line cut-off. That lease, they say, and the operating expense of the cut-off from the Auto club junction to Holden street, Minneapolis, is the "old man of the sea" that has overburdened the Dan Patch and brought it to its knees.

Judge Booth began yesterday hearing on a petition of Mr. Bratnober, the Minneapolis Trust company and other interests representing the bond holders of the line, for permission to cease operation, dismantle it and sell the equipment.

Commission Seeks Jurisdiction.

Assistant Attorney General Flannery, appearing, to begin with, for the state railroad and warehouse commission, sought to have the court dismiss the hearing on the ground that the state commission had jurisdiction. Judge Booth could not see it that way. Mr. Flannery remained to represent the state's interest in the proceedings.

At the outset John Lind and associate counsel for the Dan Patch Patrons' Protective association failed in an attempt to have the hearing postponed on the plea that their client should have more time to prepare its case in opposition to the petition.

Mr. Lind declared that an issue of fundamental importance was involved—no less than a setting aside by a federal court of a state law requiring continuance of traffic service, justified, if at all, on the ground that the bondholders would suffer if the state legislation were not swept aside. David F. Simpson of counsel for petitioners disputed the assertion, holding that there was no state law authorizing the railroad and warehouse commission to compel the road to continue service in the existing circumstances.

Railroad Loses Monthly.

Mr. Bratnober testified that the line had lost $18,000 in ten months since he became receiver as against a monthly loss of from $6,000 to $7,000 before that. He said he had cut the losses by reducing the number of employes and trains, estimating that by so doing he had reduced operating expenses two-thirds and revenues one-third.

Mr. Flannery asked whether as receiver his major purpose had not been rather to conserve the property in the interests of the bond holders than to give service in the interests of the patrons. Mr. Bratnober denied this. Mr. Flannery suggested that decreasing service seemed to him a poor way of encouraging patronage, but Mr. Bratnober insisted that even with his reductions of employes and trains service itself had not been materially impaired.

The receiver said the line was losing about $1,600 monthly from operating the Luce line cutoff, exclusive of depreciation and taxes. He estimated it would require about $40,000 to put the 52 miles of Dan Patch trackage in good operating condition, of which $10,000 should be spent this year.

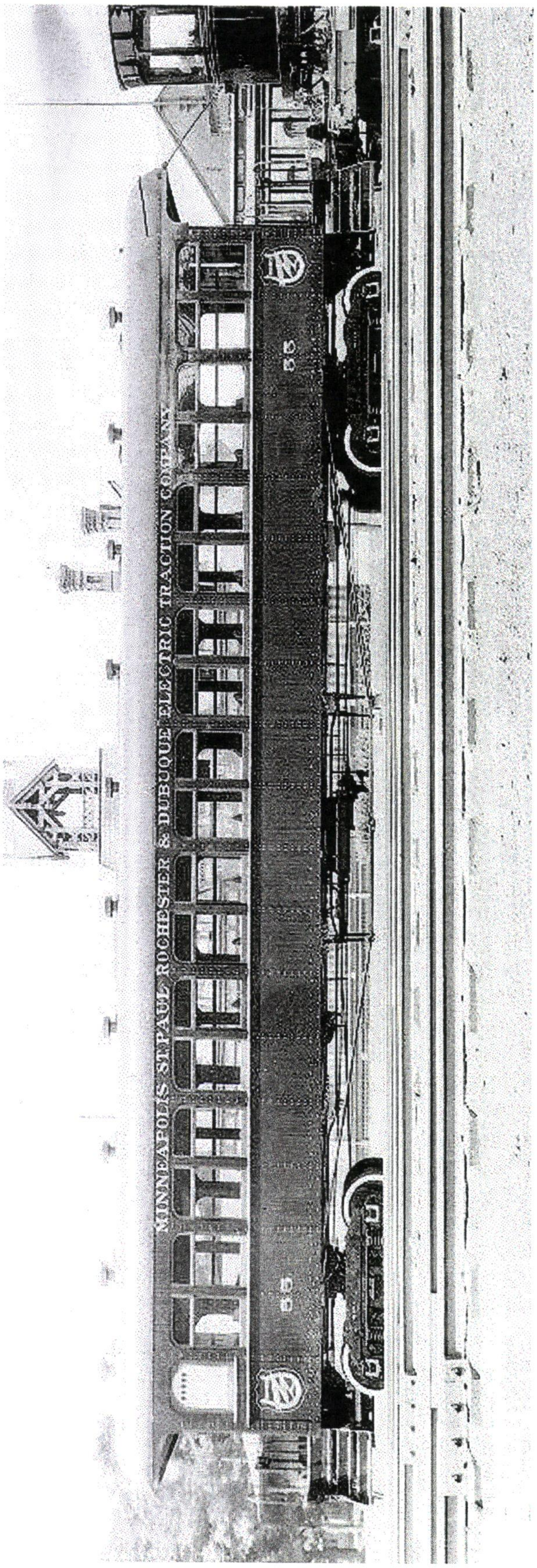
Cars Can Be Sold.

Whether the court granted the petition to scrap the road or not, according to Mr. Bratnober, the road had certain excess rolling stock equipment that should be sold. He said that the present service of the road could be continued and yet permit the sale of the following:

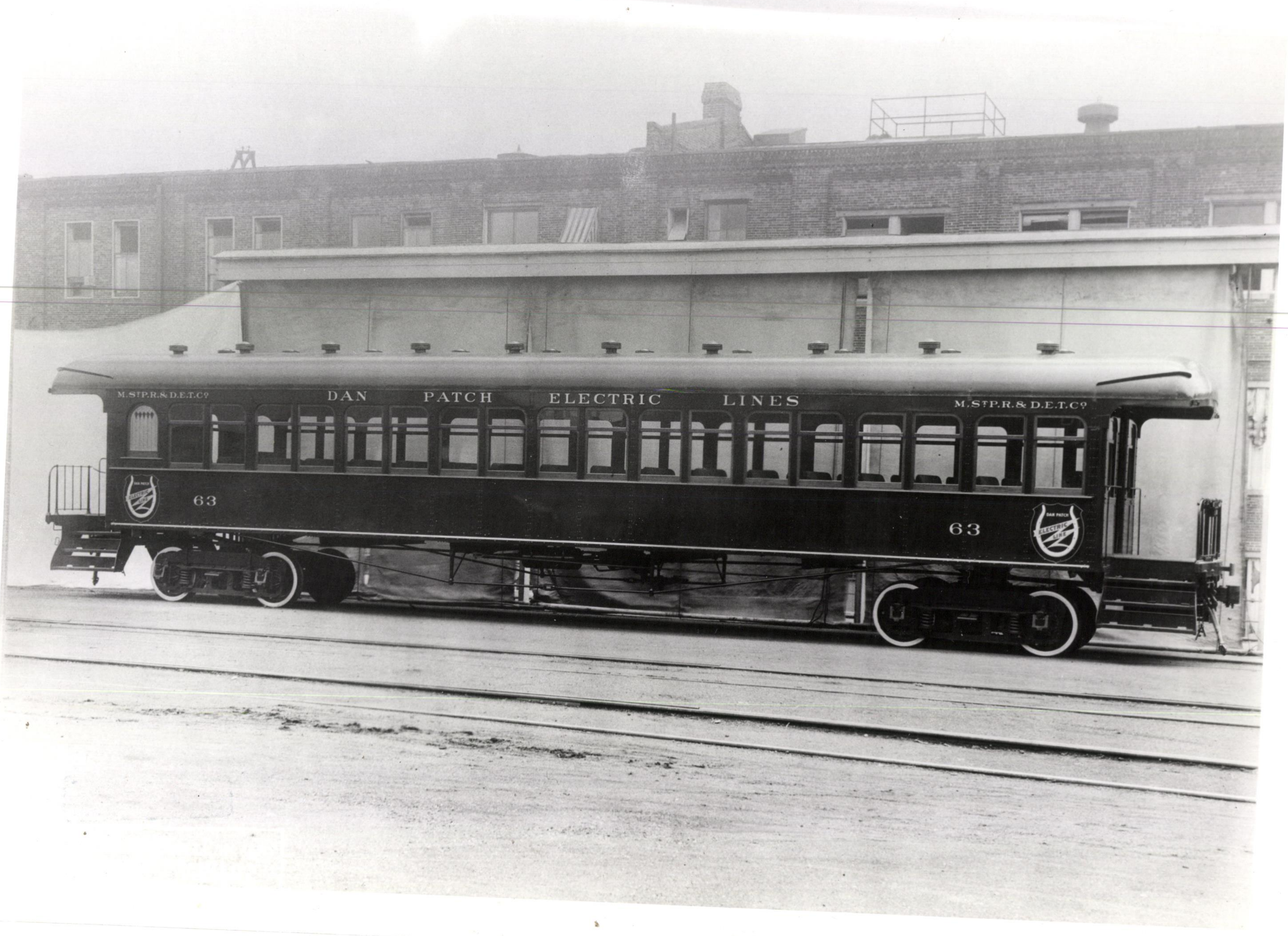
Twelve flat cars, 45 steel-frame box cars, 65 wood frame box cars, 12 or 15 coaches, 2 gas-electric motor passenger cars, 1 gas-electric freight locomotive, certain cabooses, milk cars and other equipment.

Much of this stock had been bought, he explained, when the plan was adopted to run trains between Minneapolis and Mankota. This had been discontinued before the receivership was declared. The market, the receiver said, was exceedingly good for sale of this equipment, and it would realize approximately $150,000 in the next 90 days "if the war doesn't stop."

M. D. Purdy, David F. Simpson, J. O. P. Wheelwright, W. A. Lancaster and John I. Dille are the counsel for the petitioners. Judge Booth adjourned the hearing until Friday morning.


MINNEAPOLIS ST. PAUL ROCHESTER & DUBUQUE ELECTRIC TRACTION COMPANY
55
55

WASON MFG. CO. PHOTOGRAPH


M. St P.R.& D.E.T. Co
DAN PATCH ELECTRIC LINES
M. St P.R.& D.E.T. Co
63
63
DAN PATCH
ELECTRIC LINE

NEVADA NORTHERN RAILWAY

According to a Nevada Northern Railway roster of passenger cars, this company purchased only four passenger trailers in April, 1917, at a cost of $5,500 each. The roster states they were built by J. G. Brill Company in 1912 and were 48'6" long. This is the measurement for Trailers 54-62 built during 1912-1913; however the photographs show the cars with the long platforms used only on Trailers 63-74 built during 1915. The roster also states that the NN Ry. at that time was also offered gas-electric passenger cars 6 and MARION, but NN Ry. had no interest in them.

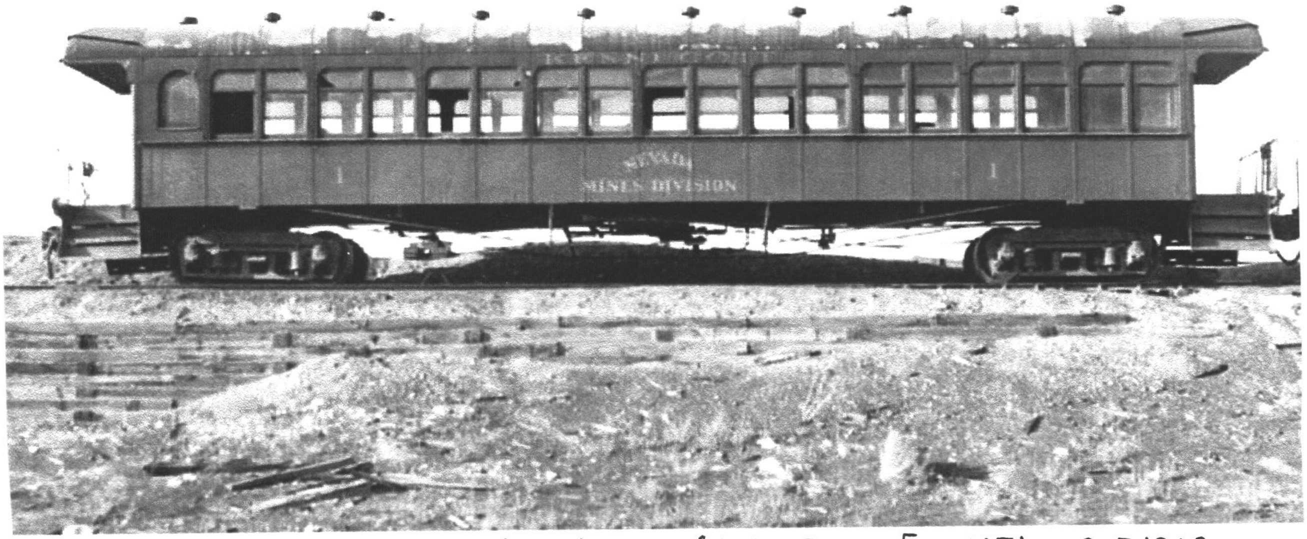
Based on the roster three passenger trailers (63,64,65) were used in school train service and shift change trains to Ruth and McGill, Nevada. In addition one passenger trailer was rebuilt to a combination baggage-passenger trailer. The following information is taken verbatim from the roster.

#63 was sold October 1943 to the Utah Copper Company for use as a shift change car in their Bingham Pit. Became their #9. Stored at Bingham on the RIP track (the old Bingham & Garfield Railroad main line) east of the Dry Fork Shops in Octboer 1977 (perhaps as late as July 1978).

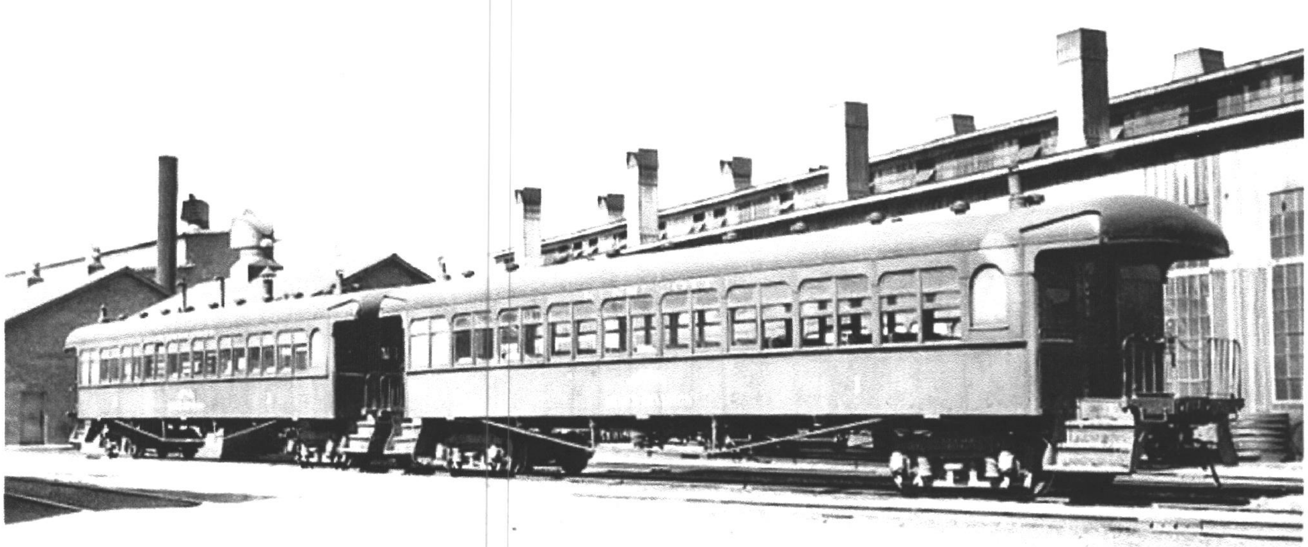
#64 was sold August 31, 1940, to the NCC Co. for use as a shift change car at the Ruth Liberty Pit. Became their #1 (Kennecott Copper Corp. Nevada Mines Division). Scrapped circa summer 1957.

#65 came from the Dan Patch Line as #31 and was renumbered #65 about 1917. Sold August 31, 1940, to the NCC Co. for use as a shift change cr at the Ruth Liberty Pit. Became their #2 (Kennecott Copper Corp. Nevada Mines Division). Scrapped circa summer 1957.

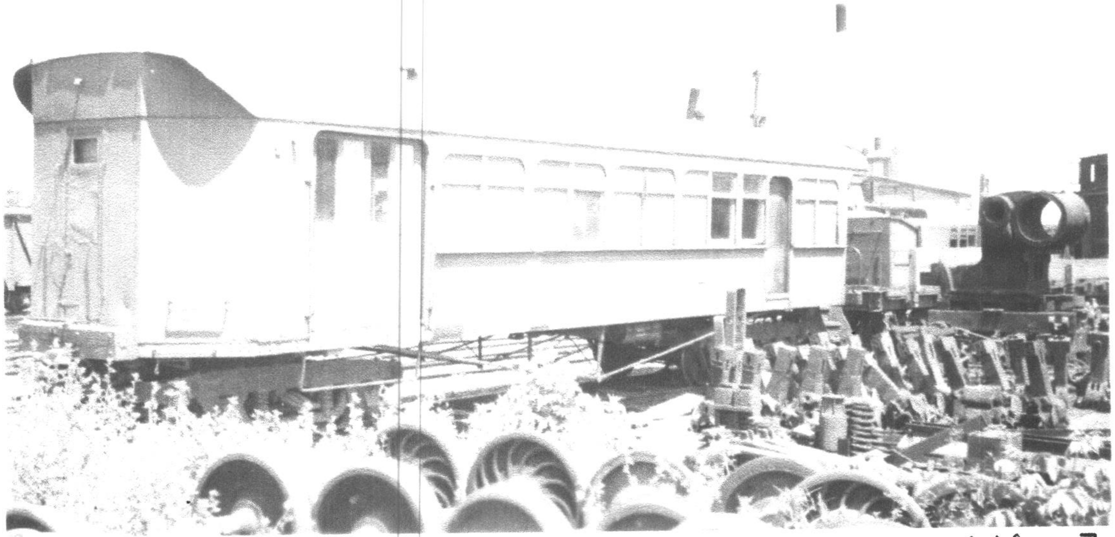
Baggage-Passenger Trailer #03 came from the Dan Patch Line as #30; rebuilt on arrival at the NN Ry. and renumbered #03. Sold to Kennecott Copper Corp. in October, 1945. Used first as a Community Car and later as a Hospital Car. Stored on a spur track near the Wedge Shaft of the Copper Flat Mine. Scrapped circa summer 1957.



KCC NMD EMPLOYEE CAR 1 (NN 64) ON MONITOR SPUR, COPPER FLAT, NEV. OCT 1948



KCC 2 AND 1 AT COPPER FLAT ENGINE HOUSE, RUTH, NEV. 9-18-1949



MN&S W 45 Ex APEL 200 rebelt from 7

DAN PATCH ELECTIC LINES
EQUIPMENT TOTALS (MRR&WH Commission)

	6/30/1911	6/30/1912	6/30/1913	6/30/1914
Passenger Motors	7	9	10	12
Passenger Trailers	0	6	12	12
Freight Trailers	0	23	23	23
Bsaggage Trailers	0	1	1	1
Electric Locomotives	0	0	0	1

	6/30/1915	6/30/1916	12/31/1916	12/31/1917
Passenger Motors & Trailers	19	30	21	7
Freight Trailers	123	165	69	67
Baggage Trailers	0	0	0	0
Electric Locomotives	1	4	0	0
Passenger-Baggage Trailers	1	1	0	0
Work Trailers	1	1	1	1
Steam Locomotives	3	1	1	1
Express Trailers	0	1	0	0
Snow Plow Trailers	0	1	0	0
Miscellaneous	0	2	0	0
Total	148	207	92	76

Brill Magazine November 1915	
Passenger Motors & Trailers	19
Gas-Electric Locomotives	4
Steam Locomotives	3
Baggage Car	1
Mail Car	1
Milk Car	1
Box Cars	147
Flat Cars	15
Refrigerator Cars	6
Gondola Car	1

McGraw Directry July 1918	
Passenger Motors	3
Passenger Trailers	4
Freight Trailers	60
Steam Locomotive	1

DPEL

6-30-11

Motors 7	Trailers 0
1-2, 4-8	

6-30-12

Motors 9	Trailers 6
1-2, 4-10	50-53, 54-55

6-30-13

Motors 10	Trailers 12
1-10	51-53, 54-62

6-30-14

Motors 12	Trailers 12
1-12	51-62

6-30-15

Motors & Trailers 19

Motors 2, 4-6, 8-12 = 9
Trailers 51-53, 54-55, 57-61 = 10

6-30-16

Motors & Trailers 30

Motors 4-6, 8-14, 15 = 11 (2 re #15)
Trailers 54-55, 57-61, 63-74 = 19

30

Dan Patch Line. Started work on road June 10-1907 operate July 4 1910

Augusta Cars had 4 cyl 2 cy. engine
Irene " 6 "
Rosemount same as Irene -
Geo A. Rourk same in Nov 1910 with #3 - as demonstrat

Motor #3 Serial # 3720 had 90 H.P. 8 cyl 4 cy-V eng G.E. Started by Black short gun cartridge. Bosch K8/2 Mag low tension with Magnetic plugs. Battery lighting. Exciter generator. Air Comp on crank shaft. L Head type cyls 1 cam shaft in centre for both sides of eng. Mech lubricator for main bearing & scoop on connecting rods. 2 motors GE 72A 250V 1 motor in each truck.

Motors - 4-5-7-8 3709-3710-3708-3706- had - 175 H.P. 8 cyl V type 4 cy Eng. with aux exhaust at bottom of cyl stroke 2 K8/2 low tension Mag ~~with~~ low tension Magnetic Plugs. Plugs cost $12.00 each. ~~Changed Mag in 19?? to high tension Bosch Mags and H.T. Plug~~ air starting equipment. No exciter. Had auxiliary eng for lighting & air compressor. 4-5-7 had exciter generator. 2-205-B Motors in front truck

Motor #6 had 125 H.P. 8 cyl-V type 4 cy. eng low tension Mag & Plugs. Air starting equipment, exciter generator. Aux eng for lighting & air comp. L type cyl heads. 1 cam shaft for both sides of eng. Mech lub for main bearings & splash for rods etc. Motors 2-205B in front truck

Motors 9-10-11-12-13-14-15 had 175 H.P. 8 cyl 4 cy-V type eng same as now in use 8x10 cyl. 550 RPM. Max. 2-205B motors in front truck air comp. direct connected to camshaft. 2-K8/2 Mags & magnet plugs. Changed on Motors 13-14-15 to Bosch H.T. Mags & plugs in 1918 & 1919

Now 12 is old F.L.C. Car 203

Locos 100-101-102-103- Purchased 1913 & 1915 - 2-175 HP. 8 cyl 4 cy V eng 4-205B motors air start on 1st eng and elect on 2nd eng. Aux G.M. 23- 4 cyl. (aux air motor driven) operate either end. Radiator on roof. Used in freight & Passeng service. good for 50 miles per hour. Tonnage cap as remember 200 tons estimated weight 60 tons.

List of Passenger Cars of the Minneapolis St.Paul Rochester and Dubuque Electric Traction Co.

Pres June 30 1911 $13 265.64

Car Number.	Seating Capacity	Date Received.	Length.	Length of Bag.Room.
3 R.E.		Dec.17th,1915.	(Destroyed by fire 11/19/14)	
4 S.E.	47 (three in a seat)	May 1911	59 feet	8 feet.
5 S.E.	47 (" " " ")	May 1911	59 "	8 "
6 R.E.	66 (" " " ")	June 1911	57 "	11 "
7 R.E.	Mail & Baggage car 200	July 1911	(Destroyed in wreck 14-15- rebuilt into , 15ft. Mail and 25ft.baggage compartments.)	
8 R.E.	86 (three in a seat)	March 1912.	67 Feet	11 feet.
9 R.E.	91 (" " " ")	May 1912.	70 "	11 "
10 R.E.	91	May 1912.	70 "	11 "
11 R.E.	91	August 1913.	70 "	11 "
12 R.E.	91	August 1913	70 "	11 "
13 R.E.	91	August 1915	72 "	11 "
14 R.E.	91	August 1915	72 "	11 "
15 Man				

Trailer Cars

54	104 (three in a seat)	June 1912.
55	"	" 1912.
56	"	April 1913. (Totally destroyed by fire. Nov. 19th, 1915.)
57	"	" "
58	"	" "
59	"	" "
60	"	May 1913
61	"	" " (Smoker in end, reinforced platform.)
62	"	" " (Totaly destroyed by fire. Nov. 19th, 1915 .)
63	"	June 1915.
64	"	" "
65	"	" "
66	"	" "
67	"	"
68	"	"
69	"	"
70	"	July 1915.
71	"	" "
72	"	" "
73	"	" "
74	"	" "

Augareta sold to Sun line
Irene - Marrion
Rosemount West fire
Strand K.C.

-1909 or 1910-

G.E. Co #2 - 1917 - Irene
off line - 1914-15 -

Irene off line 1914-15

A1 - off line - Augareta 14-15
Dec 6-1910

Rosemount - 14-15
Dec 6-1910

another #2 - Gas Car G.E. 6-30-13 $ 2 221.58
Ret. 6-30

LOCOMOTIVES.

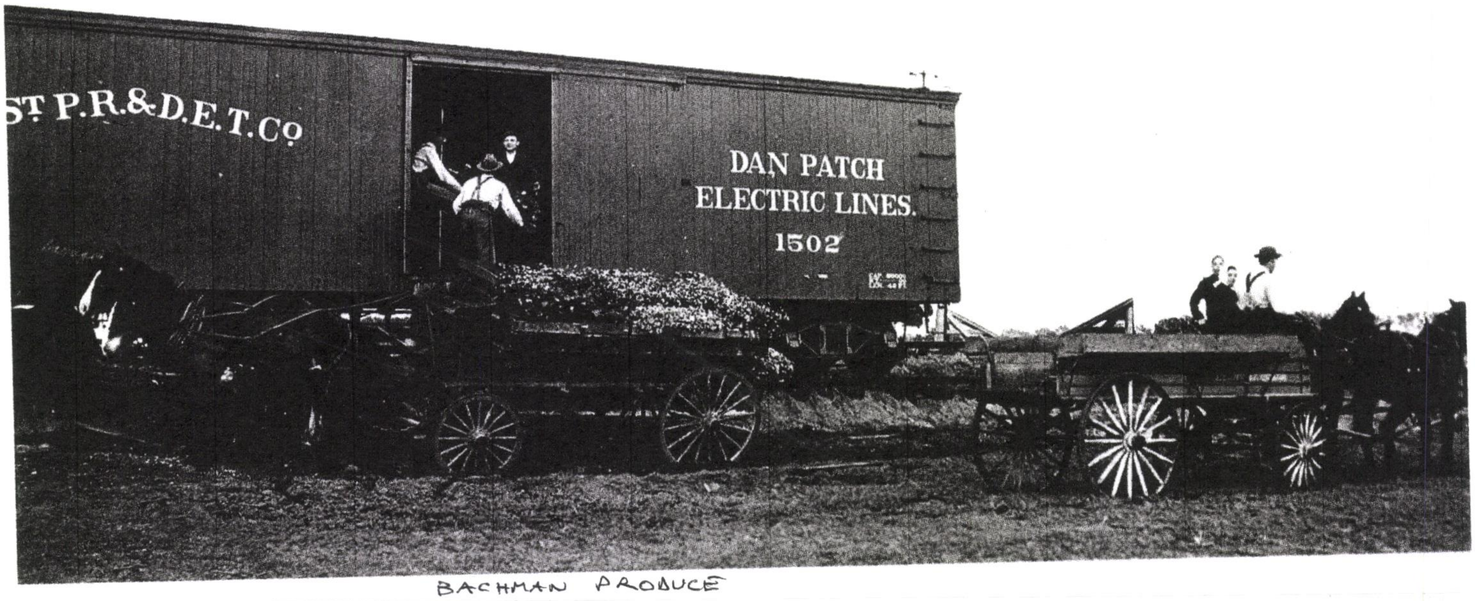
Steam locomotives 300, 301, 302, bought of the H.K.Porter Locomotive Co. Pittsburg , Pa. September 1914.

Electric locomotive #100, bought of General Electric Co. Erie , Pa. July 1913.
Electric locomotives 101,& 102, bought of General Electric Co. Erie, Pa. July 1915.
Electric locomotive 103, bought of General Electric Co. Erie, Pa. August 1915.

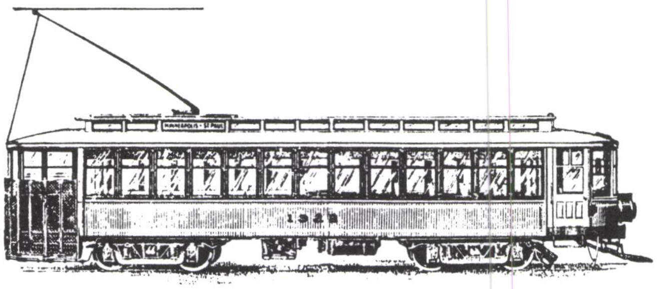
MISCELANEOUS FREIGHT CARS.

The old Dan Patch box cars and flats were bought in Chicago in 1912. Builder unknown , same may be had at Auditor's office .
Milk cras were bought in 1910.

Milk car 210. Built at 60th Street Shops lenghh 59 feet Put in Service August 1915.



BACHMAN PRODUCE



Russell L. Olson
8212 Sheridan Avenue South
Bloomington, MN 55431-1646

May 9, 1996

MY COPY

Raymond F. Corley
P. Allen Copeland

Mpls. St.Paul Rochester & Dubuque Electric Traction Co.
G.E. Gas-Electric Locomotives #100-103

I was finally able to locate the Minneapolis Anoka & Cuyuna Range R.R. Receiver's Notebook 1926-1930 in the Great Northern Ry. Archives at the Minnesota Historical Society, St. Paul. Charles P. Bratnober was president of the MACR, the first receiver of the MStPR&DET Co., and president of Central Warehouse Co., St.Paul. He was responsible for the preservation of #100. As it turns out, he also preserved all the documents and blueprints involved with the purchase of #100-103 and these are preserved intact in the MACR Receiver's Notebook. The "notebook" is actually an 8½"x11" post binder, about 7" thick, containing a wide variety of documents, correspondence, inventories, cost reports, etc., etc., analyzing ICC Road & Equipment Accounts 500 to 550 with the objective of determining the original cost, current physical condition, and estimated cost of improving the physical condition.

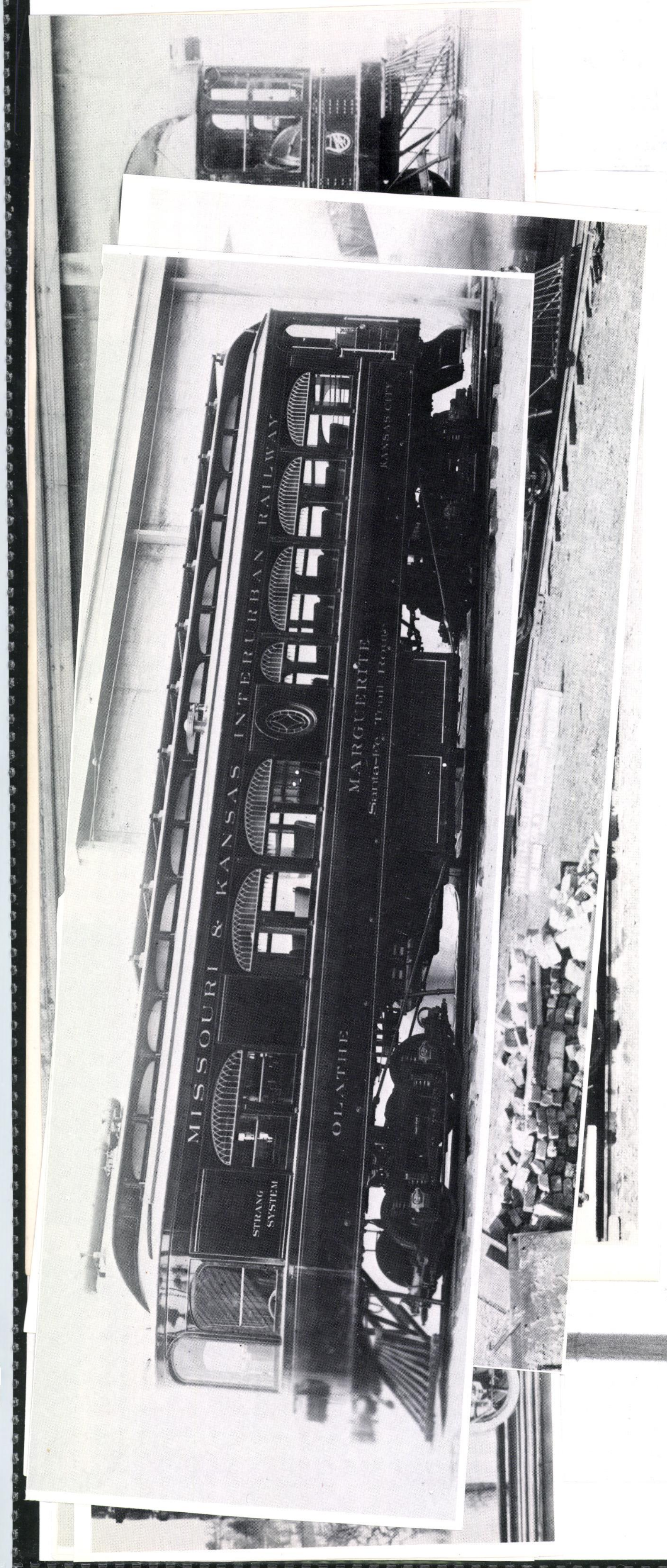
G.E. documents comprise MStPR&DET Co.'s copies of the purchase agreements for (1) #100 dated 11-17-1912 ($34,500), (2) three locomotives dated 10-8-1913, ($97,500) accepted by MStPR&DET Co. 12-26-1913, but never executed (they purchased three steam locomotives instead), and (3) three locomotives dated 2-18-1915 ($147,346). Each agreement has many pages of specifications plus blueprints of side and end elevations and floor plans.

There also G.E. four-page preprinted forms listing all individual parts and components; the actual part numbers were inserted by the "ditto" (blue ink) method. There were seven sets included, all with a compilation date 3-29-1916.

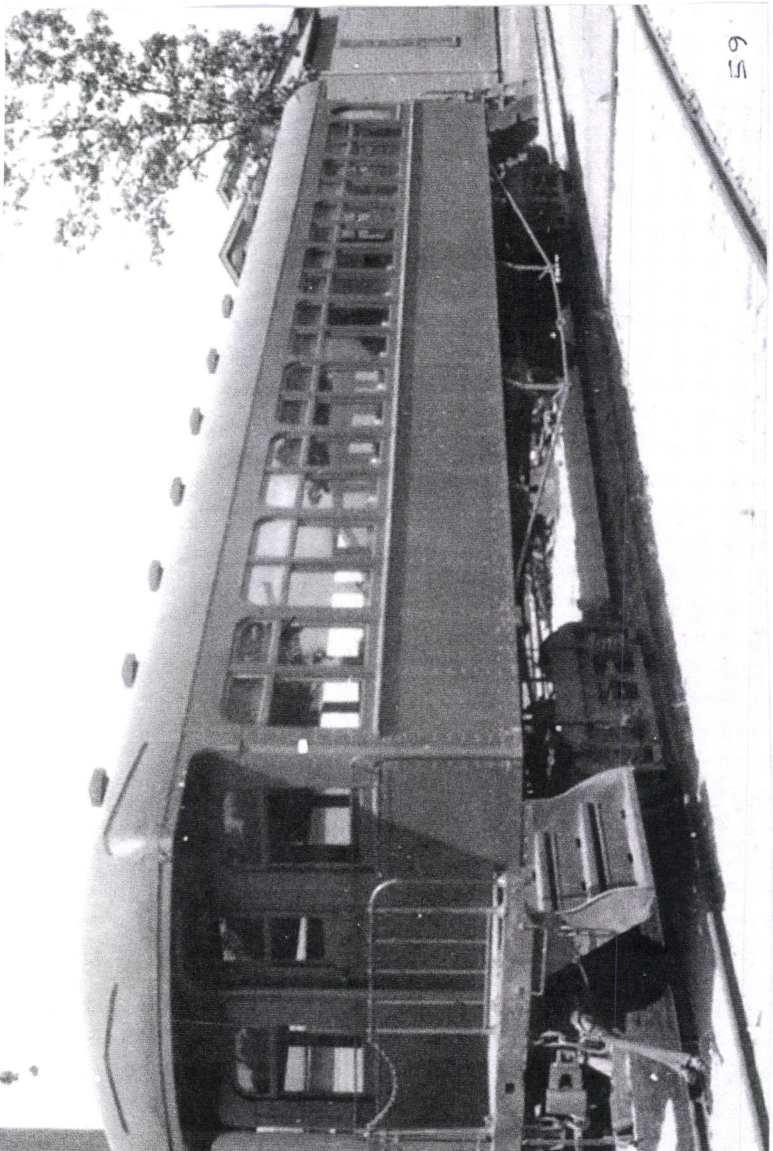
G.E. #	Cust.#	G.E.#	Cust.#	
3708	7	3735	15	(actually #9)
3706	8	3736	16	(actually #10)
3766	11	3763	100	
3767	12			

There is a sheaf of correspondence with G.E. during 1927 when MACR was attempting to purchase spare gears and pinions for the 205D motors. Apparently the orginal gear ratio of 17:58 had been changed by the Central Warehouse Co. to 17:73 and this was causing no end of communication problems.

I was pressed for time during my visit and did not examine any of these documents in detail. Howev [illegible] [illegible]ted in knowing these original documents still exist. The MHS Collection Title is Great Northern Ry. Co. Archives, and the Locator # is 136.I.16.4F, available at the Weyerhauser Re[illegible]


MISSOURI & KANSAS INTERURBAN RAILWAY
MARGUERITE
Santa-Fe Trail Route
KANSAS CITY
OLATHE
STRANG SYSTEM

The clipped photos are from ERofM. They were printed lighter and show more detail. Keep them for reference purposes.



JUNE 1917

MINNEAPOLIS, ST. PAUL, ROCHESTER AND DUBUQUE ELECTRIC TRACTION COMPANY.

(DAN PATCH LINES.)

C. P. BRATNOBER, Receiver.

GENERAL OFFICERS.

Geo. O'Rourke, Gen. Superintendent	7th St. & 3d Ave. North, Minneapolis, Minn.	O. Johnsen, Car Service Agent	7th St. & 3d Ave. North, Minneapolis, Minn.
C. E. Warner, Attorney for Receiver		R. J. Towey, Auditor	
Geo. I. Myron, Gen. Freight & Passenger Agent	"	R. E. Sartell, Freight Claim Agent	"

GENERAL OFFICES, 7th ST. & 3rd AVE., NO., MINNEAPOLIS, MINN.

Miles of road operated, 56. Gauge, 4 ft. 8½ in. Locomotives, 3.
Limit of load allowed to pass over this line in excess of marked capacity, 10 per cent.
Freight handled by steam power.

FREIGHT EQUIPMENT.

The freight cars of this Company are marked "M., St. P., R. & D. E. T. Co." and "Dan Patch Electric Line" and numbered and classified as follows:

KIND OF CARS.		NUMBERS.	DIMENSIONS.												CAPACITY.		NO.
			Inside.			Outside.					Doors.						
								Height from Rail.			Side.		End.				
M. C. B. Designation	CLASS.		Length	Width	Height	Length	Width at Eaves or Platform.	To Eaves.	To Top of Platform or Runn'g Board.	To over all	Width	Height	Width	Height	Cubic Feet Level Full.	Pounds or Gallons.	
			ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.			
	Flat	502 to 506				37	9 4									60000 lb.	5
	"	508, 509				37	9 4									60000 lb.	2
	"	510 to 516				34	8 9									50000 lb.	7
	Box	100	37	8 7	6 10	39 7	8 7								2171	50000 lb.	1
	"	1001 to 1004	33 9	8 2	6 10	34 7	9 6		12 5	13 2					1888	50000 lb.	4
	"	1501, 1502	44 5	9	7 10	45 10	10 2		13	13 10					3184	60000 lb.	2
	"	2000 to 2093	36													60000 lb.	91
	"	2500 to 2544	36	8 6	8										2148	80000 lb.	45
	Refrigerator	3000 to 3005	36													60000 lb.	6
	Gondola	101	28	7 9	8 6	30	8 8								759	30000 lb.	1
	Miscellaneous																3
	Total																167

PASSENGER EQUIPMENT.

Motor—6, 8, 13, 14, "Marion"	5
Passenger—54, 55, 57 to 61, 63 to 74	19
Baggage & Mail—200	1
Baggage—210	1
Total	26

Report movements and mileage or per diem to O. Johnsen, Car Service Agent, Seventh St. & Third Ave. North, Minneapolis, Minn.

Claim must be filed with the Receiver for balances prior to July 21, 1916. Remittances will be made by check for all business subsequent to July 21, 1916.

Send bills for repairs to cars to O. Johnsen, Car Service Agent, Seventh St. & Third Ave. North, Minneapolis, Minn.

FREIGHT CONNECTIONS AND JUNCTION POINTS.

Chicago, Burlington & Quincy—Minneapolis, Minn.
Chicago Great Western—Minneapolis, Minn. (via Great Northern); Northfield, Minn.
Chicago, Milwaukee & St. Paul—Minneapolis, Minn. (via Gt. Northern).
Chicago, Rock Island & Pacific—Minneapolis, Minn. (via Great Northern).
Chicago, St. Paul, Minneapolis & Omaha—Minneapolis, Minn. (via Great Northern); Savage, Minn.
Electric Short Line—Luce Line Jct., Minn.
Great Northern—Minneapolis, Minn.
Minneapolis & St. Louis—Minneapolis, Minn. (via Great Northern).
Minneapolis Eastern—Minneapolis, Minn. (via Great Northern).
Minneapolis Ry. Transfer—Minneapolis, Minn. (via Great Northern).
Minneapolis, St. Paul & Sault Ste. Marie—Minneapolis, Minn. (via Gt. Nor.)
Minneapolis Western—Minneapolis, Minn. (via Great Northern).
Northern Pacific—Minneapolis, Minn. (via Great Northern).

May, 1917.

Big Fork & International Falls Railway Co.

GENERAL OFFICERS.

J. M. Hannaford, President	St. Paul, Minn.
W. H. Gemmell, General Manager	Brainerd, Minn.
M. W. Downie, Auditor	" "
G. H. Warner, Train Master	" "
J. L. Hurd, Car Accountant	St. Paul, Minn.
H. E. Titus, Master Mechanic	Bemidji, Minn.

GENERAL OFFICES, BRAINERD, MINN.

Miles of road operated, 33.64. Gauge, 4 ft. 8½. Locomotives, 1.

PASSENGER EQUIPMENT.

Baggage—30	1
Coach, First Class—31	1
Total	2

Report movements and mileage or per diem to J. L. Hurd, Car Accountant, St. Paul, Minn. Mileage and per diem of foreign cars on B. F. & I. F. are included in Northern Pacific reports.

Balances should be included with the Northern Pacific Co.'s statements.

Send bills for repairs to cars to M. W. Downie, Auditor, Brainerd, Minn.

All reports of cars re-lightweighed and stencilled on foreign roads should be sent to W. H. Gemmell, General Manager, Brainerd, Minn.

Address embargo notices, etc., under Per Diem Rules 13 and 15 to W. H. Gemmell, General Manager, Brainerd, Minn. *August, 1915.*

Sugar Pine Railway Company.

GENERAL OFFICERS.

R. D. Robbins, Pres.	Suisun, Cal.	E. Parke, Traffic Mgr.	Sonora, Cal.
D. H. Steinmetz, Gen. Mgr.	Sonora, Cal.	J. C. Rassenfoss, Sec.	"
		J. B. Miller, Aud.	"

GENERAL OFFICES, SONORA, CAL.

Miles of road operated, 15. Gauge, 4 ft. 8½ in. Locomotives, 4.

FREIGHT EQUIPMENT.

The freight cars of this Company are numbered and classified as follows:

Kind of Cars.		Numbers.	Inside Dimensions.			Cap'cty Pounds or Gallons.	No.
M. C. B. Designation	CLASS.		Length	Width	Height		
			ft. in.	ft. in.	ft. in.		
FL	Flat	1 to 70	40			80000 lb.	70
	"	101 to 120	34			60000 lb.	20
	Total						90

PASSENGER EQUIPMENT.

Gasoline Motor	2

Report movements and mileage or per diem to Sugar Pine Ry., Sonora, Cal.

For balances remit to Sugar Pine Ry., Sonora, Cal. Do not draw for balances as balances against Sugar Pine Railway Company will be settled by voucher.

All reports of cars re-lightweighed and stencilled on foreign roads should be sent to Sugar Pine Ry., Sonora, Cal.

Send bills for repairs to cars to Sugar Pine Ry., Sonora, Cal.

Address embargo notices under Per Diem Rule 15 to Sugar Pine Ry., Sonora, Cal.

Cars of greater length than 40 ft. and cars equipped with outside hung brakes, will not be accepted for movement over this line on account of the curvature of the track.

FREIGHT CONNECTIONS AND JUNCTION POINTS.

Sierra—Ralph, Cal.

June, 1917.

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CONTENTS OF THE BACK POCKET

Dan Patch Electric Line Gas-electric Passenger Cars

1 "Ogerita". ex Missouri & Kansas Int. Ry. 1 "Ogerita" acquired June 1910. Strang-Brill built Feb 1906. Power plant at Antlers Park 1912. Retired 1914.

2 "Irene". Strang Gas-Electric Car Co. demonstrator. Strang-Brill built Mar 1908. Acquired June 1910. Rebuilt by G.E. May 1913 with GE-Wason equipment replacing Strang-Brill equipment. Renumbered 15 Jun 1915. To MN&S Ry. Aug 1918. Retired 12/1/32.

1st 3 "Rosamond". Strang Gas-Electric Car Co. demonstrator. Strang-Brill built Apr/May 1908. Acquired June 1910. Accidentally destroyed by fire early 1911.

G.E. Demonstrators:
Demo #3 made the first official trip over the line July 2, 1910, 50th St. to Savage.
Demo #2 photographed in Northfield Dec 1910.
Demo #3 photographed on Nicollet Ave., Minneapolis, May or Jun 1911.
Electric Traction Weekly 4/8/11 reported that "a G.E. car [Demo #2] has been handling the service during the past three months, making two round trips daily. 'Irene' now used in regular service, was in constant service for the past six months."

G.E.-Wason Built cars:

2nd 3 RE50B5 built Dec 1907 as demonstrator #2. In service on DPEL Dec 1910. Wrecked on RCBH&W Ry. 1911. Repaired by G.E. Nov 1911 and renumbered stock car #7. Acquired 1912 by DPEL. Destroyed in 60th St. Shops fire Nov 1914.

4 CE58B8 built May 1911. Sold Dec 1916 to Oklahoma New Mexico & Pacific Ry. 1.

5 CE58B8 built May 1911. Sold 1917 to Okmulgee Northern Ry. 110.

6 RE57 built Feb 1911 as stock car 4. Acquired by DPEL Jun 1911. Sold 1916 to Warren & Ouachita Valley Ry. 4.

7 RE57B6 built Jul 1911. Damaged in collision with locomotive 100 1914 and rebuilt to mail-baggage trailer 200.

8 RE67B11 built between Apr-Jun 1911 as stock car #6. Acquired by DPEL Mar 1912. Sold Apr 1917 to Spokane Portland & Seattle Ry. 1102.

9 RE70B11 built May 1912. Sold Nov 1916 to Visalia Electric RR 450.

10 RE70B11 built May 1912. Sold 1916 to Oklahoma New Mexico & Pacific Ry 6.

11 RE70B11 built Aug 1913. Sold Dec 1916 to San Diego & Southeastern Ry. 41.

12 RE70B11 built Aug 1913. Sold Dec 1916 to San Diego & Southeastern Ry. 42.

13 RE70B11 built Jul 1915. To MN&S 13 Aug 1918.

14 RE70B11 built Aug 1915. To MN&S 14 Aug 1918.

G.E. Gas-electric Locomotives:

100 built Jun 1913. Underframe and body built in Erie, Penn. Wason trucks. Received 7/4/13. Sold 1917 to Central Warehouse Company, St.Paul. Remaining history is well-known.

101 G.E.-Wason built Jun 1915. Sold Nov 1916 to SP Ry./Pacific Electric Ry. 2nd1501. Scrapped Sep 1944.

102 G.E.-Wason built Jun 1915. Sold Nov 1916 to SP Ry./Visalia Electric RR 402. Re-sold Aug 1918 or Nov 1919 to Pacific Electric Ry. 1502. Scrapped Sep 1944.

103 G.E.-Wason built Jul 1915. Sold Nov 1916 to SP Ry./Visalia Electric RR 401. Scrapped 1951.

General Electric Co./Wason Mfg. Co. builders

Number	Type	G.E. Bldrs. No.	Wason Order No.	Built	G.E. Engine	G.E. Motors	Trucks	Seats
2nd 3	RE50B5	3720	?	12-1907	GM-10A1	two 72A	ALCo MCB	44
4	CE58B8	3709	10270	5-1911	GM-16A1	two 205B	Wason RM54B	47
5	CE58B8	3710	10270	5-1911	GM-16A1	two 205B	Wason RM54B	47
6	RE57	3704	9780	2-1911	GM-10B2	two 205B	Wason RM54B	88
7	RE57B6	3708	9930	7-1911	GM-16A1	two 205B	Wason RM54B	75
8	RE67B11	3706	9781	?-1911	GM-16B	two 205D	Wason RM54B	88
9	RE70B11	3735	12050	5-1912	GM-16A5	two 205D	Wason RM54B	91
10	RE70B11	3736	12050	5-1912	GM-16A5	two 205D	Wason RM54B	91
11	RE70B11	3766	13700	8-1913	GM-16C1	two 205D	Wason RM54B	69
12	RE70B11	3767	13700	8-1913	GM-16C1	two 205D	Wason RM54B	69
13	RE70B11	3789	16500	7-1915	GM-16C5	two 205D	Wason RM54B	69
14	RE70B11	3790	16500	8-1915	GM-16C5	two 205D	Wason RM54B	69
15	RE63	3764	na	reb 5-1913	GM-16C1	two 205D	Wason RM54B	48
100	Locomotive	3763	13515	6-1913	2 GM-16C4	four 205D	Wason RM54B	
101	Locomotive	3786	16503	6-1915	2 GM-16C5	four 205D	Wason RM54B	
102	Locomotive	3787	16503	6-1915	2 GM-16C5	four 205D	Wason RM54B	
103	Locomotive	3788	16503	7-1915	2 GM-16C5	four 205D	Wason RM54B	

A G.E. Demonstrator made the first official trip 7-2-1910 Minneapolis to Savage.

(1) G.E. Demonstrator 2 was photographed 12-1910 in Northfield. Apparently used in regular service Dec 1910 thru Mar 1911: ETW 4/8/11 "a G.E. car has been handling the service during the past three months, making two round trips daily." Demo 2 was wrecked on the Rapid City Black Hills & Western Ry. later in 1911. Returned to G.E., wreck damage repaired Nov 1911, s/n 3720 assigned with road number 7 for stock car 7. Acquired by MStPR&DETr Co. 1912 probably as replacement for #1 "Ogerita". Destroyed in 60th St. Paint Shop fire 1914.

(2) Resold 1924 to Jonesboro, Lake City & Eastern RR #110. Resold 11-1-25 to the St.Louis San Francisco RR #3rd2117. Scrapped 5-1935.

(3) G.E. stock car 4 built 2-1911 also used as a demonstrator.

Weight	Rebuilt	Destroyed	Sold	Notes
64000	11-1911	11-19-14		G.E. Demo 2/Stock Car 7 Acq 1912 (1)
82000			12-1916	Sold to Oklahoma, New Mexico & Pacific Ry. #1
82000			1917	Sold to Okmulgee Northern Ry. #110 (2)
78000			1916	Acq 6-1911 (3) Sold to Warren & Ouachita Valley
				#4. Subsequently converted to a Trailer.
80000	1914			Damaged in head-on collision with Locomotive 100
				in 1914. Rebuilt into Mail-Baggage Trailer with
				15 ft. Mail Compt. and 25 ft. Baggage Compt.
91000			4-12-17	Acq 3-12. G.E. Stock Car 6 built during Apr-Jun.
				Sold to Spokane Portland & Seattle Ry. #1102. (4)
98000			11-14-16	Sold to Visalia Electric RR #450. (5)
98000			1916	Sold to Oklahoma, New Mexico & Pacific Ry. #5 (6)
103000			12-1916	Sold to San Diego & Southeastern Ry. #41 (7)
103000			12-1916	Sold to San Diego & Southeastern Ry. #42 (7)
103000			8-1918	Minneapolis Northfield & Southern Ry. #13
103000			8-1918	Minneapolis Northfield & Southern Ry. #14
101500	5-1913		8-1918	Originally 2 "Irene" Strang/Brill blt 3-1908
				Rebuilt by G.E. renumbered 15 "Marion"
				Minneapolis Northfield & Southern Ry. #15
114000	1914		late 1917	Rebuilt after head-on collision with #7.
				Sold to Central Warehouse Company, St.Paul (8)
125760			11-14-16	Sold to Pacific Electric Railway #2nd 1501 (9)
125760			11-14-16	Sold to Visalia Electric Railway #402 (10)
125760			11-14-16	Sold to Visalia Electric Railway #401 (11)

(4) Resold 9-10-24 to Warren & Ouachita Valley RR #1. Subsequently converted to a Trailer.

(5) Resold 6-14-21 to Northwestern Pacific Ry. #900. Resold 12-5-38 to Southern Pacific Ry. and rebuilt to Wrecker for SF-Oakland Bay bridge operation. Scrapped 1948.

(6) Resold 1923 to Midland Valley Ry. #M-6. Scrapped 11-1954.

(7) SD&SE Ry 41 scrapped 1939; 42 dismantled 1939 (body to a field office 1940).

(8) Underframe built by Erie Steel Const. Co., carbody by Union Iron Works. Rebuilt 1918 by by CWC for straight electric operation. Resold 1922 to Mpls. Anoka & Cuyuna Range Ry. Rebuilt 8-1957 for diesel-electric operation. Donated 1967 to Minn. Transp. Museum.

(9) Scrapped 9-1944.

(10) Sold 8-17-18 or 11-13-19 to Pacific Electric Ry. #1502. Scrapped 9-1944.

(11) Scrapped 1951.

Strang Gas-Electric Car Co./J. G. Brill Co. builders								
Number	Name	Built	Brill Order No.	Length	Width	Weight	Front Truck	Rear Truck
1	Ogerita	2-06	14184	41-6 1/2	8-4	?	Brill 27-E11/2	Brill 27-E11/2
		1908	15948					
2	Irene	2-1908	15652	62-8	9-6	114000	Brill 27-E3	Brill 27-E2
		1910	17261					
3	Rosamond	4/5-1908	15771	62-8	9-6	104000	Brill 27-MCB	Brill 27-E2
		1910	17301					

Motors	Controller	Seats	Notes	
2 50 h.p.	2 K-13	?	Missouri & Kansas Interurban Ry. 1 Ogerita	
		26?	Rebuilt: center entrance removed; seating increased	
			Acq 6-1910 by MStPR&DETr Co.	
			1912: used to generate electricity at Antlers Park	
			1914: Retired	
2 100 h.p.	Type M	40	Strang Gas-Electric Car Co. demonstrator	
		33	Coach section rebuilt with smoking compartment and	
			ladies toilet/dressing room	
			Acq 6-1910 by MStPR&DETr Co.	
			5-1913 Re-equipped by General Electric Co.	
			6-1915 renumbered 15 and renamed Marion	
			8-1918 Acq by MN&S Ry.	
?	?	48	Strang Gas-Electric Car Co. demonstrator	
			Acq 6-1910 by MStPR&DETr Co.	
			ETW 4-8-1911 "accidentally destroyed by fire a	
			few weeks ago"	